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The report addresses the progress made [illegible] prevention and control of air pollution in 1985. It covers the areas of air quality trends and monitoring, developing of air quality criteria and standards, the status of State implementation plans, the control of stationary and mobile source emissions, enforcement, and litigation. The report is the annual report of the Administrator of EPA to the Congress in compliance with Sections 313, 202(b)(4), and 306 of the Clean Air Act, as amended.

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CONTENTS

Page

PREFACE.. v

I. INTRODUCTION AND SUMMARY

A. Overview I-1
B. Air Quality Trends, Monitoring, and Modeling.......... I-1
C. Air Pollution Research Programs........................ I-3
D. Development of National Ambient Air Quality Standards. I-5
E. Regulatory Assessment of Toxic Air Pollutants......... I-5
F. Status of Air Quality Management Programs............. I-6
G. Control of Stationary Source Emissions................ I-8
H. Stationary Source Compliance.......................... I-9
I. Control of Mobile Source Emissions.................... I-10
J. Stratospheric Ozone Protection I-12
K. Radon Assessment and Mitigation I-13
L. Litigation... I-13

II. AIR QUALITY TRENDS, MONITORING, AND MODELING

A. National Air Quality and Emission Trends.............. II-1
B. Ambient Air Monitoring................................ II-4
C. Air Quality Modeling.................................. II-6
D. Integration of Air Data Systems....................... II-9
E. Emission Factor Development........................... II-9
F. National Dioxin Study................................. II-9
G. References II-10

III. AIR POLLUTION RESEARCH PROGRAMS

A. Introduction.. III-1
B. General Air Pollution Research Activities............. III-1
C. Acid Deposition Research Activities................... III-7
D. References III-9

IV. DEVELOPMENT OF NATIONAL AMBIENT AIR QUALITY STANDARDS

A. Description of Activities IV-1
B. References IV-2

V. REGULATORY ASSESSMENT OF TOXIC AIR POLLUTANTS

A. Description of Activities V-1
B. References V-2

VI. STATUS OF AIR QUALITY MANAGEMENT PROGRAMS

A. Development of Policy and Regulations................. VI-1
B. Prevention of Significant Deterioration and
Nonattainment New Source Review Activities............ VI-4
C. Implementation Overview and Assistance................ VI-6
D. Air Pollution Training................................ VI-10
E. References VI-11

VII. CONTROL OF STATIONARY SOURCE EMISSIONS

A. New Source Performance Standards (NSPS)................ VII-1
B. National Emission Standards for Hazardous Air Pollutants (NESHAP)................................. VII-1
C. Delegation of NSPS and NESHAP.......................... VII-2
D. BACT/LAER Clearinghouse................................ VII-2
E. References VII-3

VIII. STATIONARY SOURCE COMPLIANCE

A. General.. VIII-1
B. Litigation... VIII-4
C. Compliance and Enforcement Guidance VIII-6
D. Compliance by Federal Facilities....................... VIII-7
E. List of Violating Facilities........................... VIII-7
F. References VIII-7

IX. CONTROL OF MOBILE SOURCE EMISSIONS

A. Introduction... IX-1
B. Air Toxics IX-2
C. Standard Setting....................................... IX-2
D. Preproduction Compliance............................... IX-4
E. Inspection/Maintenance................................. IX-4
F. Mobile Source Enforcement.............................. IX-5
G. Imports.. IX-6
H. References IX-6

X. STRATOSPHERIC OZONE PROTECTION

A. Description of Activities X-1
B. References X-2

XI. RADON ASSESSMENT AND MITIGATION XI-1

XII. LITIGATION

A. Introduction... XII-1
B. Title I Cases.. XII-1
C. Title II Cases... XII-2
D. Judicial Review Cases.................................. XII-2

PREFACE

The Clean Air Act, as amended, authorizes a national program of air pollution research, regulation, and enforcement activities. This program is directed at the Federal level by the U.S. Environmental Protection Agency (EPA). However, primary responsibility for the prevention and control of air pollution continues to rest with State and local governments. The EPA's role is to conduct research and development programs, set national standards and regulations, provide technical and financial assistance to the States, and, where necessary, supplement State implementation programs.

Section 313 of the Clean Air Act requires the Administrator to report on measures taken toward implementing the purpose and intent of the Act. This report covers the period January 1 to December 31, 1985, and describes the issues involved in the prevention and control of air pollution and the major elements of progress toward that goal that have been made during that time. In addition, this report also includes two other EPA reports to Congress required under the Clean Air Act, as amended:

1. Section 306 report on Federal procurement and violating facilities (Chapter VIII), and

2. Section 202(b)(4) report on measures taken in relation to motor vehicle emissions control (Chapter IX).

I. INTRODUCTION AND SUMMARY

A. OVERVIEW

This report describes the progress that the Environmental Protection Agency (EPA) has made in the prevention and control of air pollution during 1985. The following paragraphs summarize the contents of the remaining chapters of this report, especially insofar as those chapters illuminate current understanding of air quality problems, controls, and administrative apparatus. Since it takes approximately 1 year to assemble, analyze, and report air quality and emissions data on a national basis, the latest air quality and emissions data available for this report are for the year 1984.

B. AIR QUALITY TRENDS, MONITORING, AND MODELING

All of the criteria pollutants showed improvements in air quality and emissions between 1975 and 1984. Between 1983 and 1984, however, total suspended particulate (TSP), sulfur dioxide (SO_2), and nitrogen dioxide (NO_2) showed slight increases, while carbon monoxide (CO) showed a slight decline, lead (Pb) a more substantial decline, and ozone (O_3) declined from its 1983 level to the levels of 1981 and 1982. Specific details on air quality and emissions levels, for each of the pollutants to which ambient air quality standards apply, are as follows:

- Annual average ambient TSP levels decreased 20 percent between 1975 and 1984, while TSP emissions decreased 33 percent. Between 1983 and 1984, ambient TSP levels increased 2 percent, while TSP emissions increased 4 percent.

- Annual average ambient SO_2 levels decreased 36 percent between 1975 and 1984, while total sulfur oxide emissions decreased 16 percent. Between 1983 and 1984, ambient SO_2 levels increased 2 percent, while total sulfur oxide emissions increased 4 percent.

- Ambient CO levels decreased 34 percent between 1975 and 1984, while total CO emissions decreased 14 percent. Between 1983 and 1984, ambient CO levels decreased only 1 percent. This leveling off appears to be consistent with the highway vehicle portion of the transportation category which showed a 1 percent decrease between 1983 and 1984.

- Annual average ambient NO_2 levels decreased 10 percent between 1975 and 1984. Between 1975 and 1984, total nitrogen oxide emissions increased by 3 percent, but highway vehicle emissions, the source category likely impacting the majority of NO_2 monitoring sites, decreased by 4 percent. Between 1983 and 1984, ambient NO_2 levels increased 2 percent, while total nitrogen oxides emissions increased 3 percent.

° The composite average of the second highest daily maximum 1-hour ambient O_3 values decreased 17 percent between 1975 and 1984, while volatile organic compound (VOC) emissions decreased 6 percent. The decrease in ambient O_3 levels is complicated by the change in the O_3 calibration procedure which took place between 1978 and 1979. In the post-calibration period (1979-1984), ambient O_3 levels decreased 7 percent, while VOC emissions decreased 10 percent. Between 1982 and 1984, ambient O_3 levels increased (1982-83) and then decreased (1983-84). The 1984 ambient O_3 levels are very similar to the 1981-82 levels, despite an estimated national growth of almost 200 billion vehicle miles of travel between 1980 and 1984 and an expansion of economic activity in 1984.

° Ambient Pb levels decreased 70 percent between 1975 and 1984, while lead emissions decreased 72 percent. Between 1983 and 1984, ambient Pb levels declined 7 percent, while Pb emissions declined 13 percent.

The EPA promulgated regulations in 1979 which required States to establish and operate air monitoring networks and to report the data to EPA. Two types of permanent stations are provided for in the regulations: State and Local Air Monitoring Stations (SLAMS) and National Air Monitoring Stations (NAMS). The SLAMS, which were designed to meet the overall monitoring requirements of State implementation plan activities, were required to meet all provisions of the regulations by January 1, 1983. Through December 1985, 4,642 SLAMS monitors out of a total operating network of 4,674 monitors met all requirements of the regulations. The NAMS, which are a subset of the SLAMS network, are designed to provide a national monitoring network as required by section 319 of the Clean Air Act (Act). Through December 1985, 1,344 NAMS monitors out of a total planned network of 1357 monitors met all requirements of the regulations.

To accompany the proposed revisions to the national ambient air quality standards (NAAQS) for particulate matter (PM), EPA on March 20, 1984, also proposed amendments to 40 CFR 58 (Air Quality Surveillance and Reporting Regulations). The proposed revisions to Part 58 would establish ambient air quality monitoring requirements for particles nominally 10 micrometers and smaller in diameter (PM_{10}) as measured by a new reference method proposed as Appendix J of 40 CFR Part 50 or an equivalent method. In addition, new network design and monitoring siting requirements were proposed for the secondary TSP standard.

Also in the monitoring area in 1985, more ambient hydrocarbon data were gathered in 19 cities following the 22-city study of 1984. Data from the 1985 study confirm that the new analytical method yields much more reliable and accurate measures of hydrocarbon concentrations than does the older measurement method and also confirm the 1984 data in indicating that ambient hydrocarbon concentrations in major metropolitan areas are somewhat higher than previously thought.

During 1985, EPA continued its program to evaluate several categories of air quality models by completing evaluation of four mobile source models. Efforts to develop effective graphical techniques to present statistical performance information on models were continued. Multiyear cooperative agreements with the States of New York and Connecticut were continued to evaluate strategies for the control of photochemical air pollutants in the New York metropolitan area. Efforts to improve guidance on air quality models and to ensure consistency in their use also were continued, including the distribution of a report on receptor modeling and continuation of ozone modeling support efforts.

A major new focus in air quality dispersion modeling was initiated during 1985. The EPA's activities in the regulation of toxic chemical impacts required the review of available dispersion techniques to adequately address different types of air pollutant releases than previously assessed. The emphasis shifted from stack releases at a few points within the facility to an assessment of pollutant discharges from vents, valves, flanges, etc. This required the development of screening mechanisms and review of short-term release models and application of these techniques to test for potential acute health effects.

In 1985, work continued on the air quality component of the Aerometric Information Reporting System (AIRS). This system is an integrated data system that will replace entirely the existing data bases, files, and software now used by EPA for storing and retrieving ambient air quality data, stationary source and emissions data, and source compliance data.

The EPA continued to support State efforts to develop emission control strategies by publishing emission factors on various pollutants including potentially toxic pollutants. Emphasis was placed on sources of particles less than 10 microns in size and on sources of phosgene, epichlorohydrin, vinylidene chloride, chlorobenzenes, PCB's, and ethylene oxides.

Also in 1985, EPA continued to implement the National Dioxin Study to assess the potential extent of contamination of the environment with chlorinated dioxin compounds.

C. AIR POLLUTION RESEARCH PROGRAMS

Research efforts conducted by EPA in 1985 covered a wide variety of topics. Work continued on air quality criteria documents for ozone and lead. These documents provide the scientific bases for the review and possible revision of the NAAQS for these pollutants. Considerable progress was made in characterizing the effects of acute exposures to oxidants in humans. Pulmonary function effects of sulfur dioxide and aerosol particles were investigated and a 5-year follow-up study of the effects of lead on children was completed. Projects were completed on respiratory tract deposition of particles in animals. Various effects of ozone on crops were studied, an advanced atmospheric corrosion monitor was developed and evaluated, and a number of reports were prepared on the topic of measuring ambient air pollutants.

Additional research efforts included the study of a new method for measuring nonmethane organic compounds and a number of studies on the role of VOC's in producing ozone. Experiments were conducted to improve complex terrain air quality models. Control of VOC's was emphasized but research on control of emissions of other pollutants such as nitrogen oxides and sulfur dioxide was conducted.

A total of 14 comprehensive health assessment documents for potentially toxic air pollutants were completed in 1985. Research continued on the contribution of air pollution to cancer incidence in the United States and dose-response information for various air pollutants was developed. In addition, a number of experiments were completed to determine the transport, transformation, and fate of hazardous air pollutants. Progress on implementation of the toxic air monitoring system continued in 1985 and control technologies for control of toxic pollutants were investigated.

A number of research efforts related to primarily mobile source pollutants were in progress in 1985. These included carbon monoxide health effects studies and a study of the respiratory carcinogenicity of diesel particles. Studies characterizing motor vehicle emissions were completed and a report summarizing the fuels and fuel additives registered in 1985 was prepared.

Research was also conducted in 1985 on emissions from household building materials and space heaters. A workshop to discuss indoor air pollutants was sponsored and field testing related to radon mitigation techniques was completed. Research also progressed on the health and environmental effects of certain forms of ultraviolet radiation.

In addition, research continued to be conducted in the area of acid deposition. In 1985, EPA continued to participate in the work of the Interagency Task Force on acid precipitation related to the national acid precipitation assessment program. Research on monitoring dry acidic deposition was conducted and data on wet deposition were collected through the National Trends Network. Development of a regional acid deposition model that simulates atmospheric processes was completed. A special effort to develop a 1985 inventory of major emission sources of sulfur dioxide, nitrogen oxides, and volatile organic compounds was initiated to support future analytical efforts of the National Acid Precipitation Assessment Program (NAPAP). State submissions are due to EPA during the last quarter of 1986 and the final data base should be completed by June 1987. Two major research efforts were initiated to improve EPA's understanding of the aquatic effects of acid deposition and research was also conducted in the area of terrestrial effects and the effects of acid deposition on materials. In addition, EPA continued to develop limestone injection multistage burners (LIMB) technology to reduce emissions of sulfur oxides and nitrogen oxides from coal-fired boilers.

D. DEVELOPMENT OF NATIONAL AMBIENT AIR QUALITY STANDARDS

The 1977 Clean Air Act Amendments require EPA to regularly review and, if appropriate, revise the NAAQS on a 5-year basis. Reviews of all existing NAAQS were in progress in 1985. In 1984, EPA proposed changes to the NAAQS for particulate matter. The Clean Air Scientific Advisory Committee (CASAC) reviewed the proposal at a meeting in December 1985 and recommended that because of new data published since the combined criteria document for particulate matter and sulfur oxides was prepared in 1981, EPA should prepare an addendum to the criteria document and the particulate matter staff paper. Due to the time needed for preparation and CASAC review of the criteria document and staff paper addenda, final action on the particulate matter standard will be delayed until 1987. Other activities in this area in 1985 included reaffirmation of the NAAQS for NO_2 in June and reaffirmation of the primary (health-related) NAAQS for CO and revocation of the secondary (welfare) NAAQS for CO in September. In addition, work on the exposure analysis and the cost, economic, and benefits analyses for the sulfur oxide NAAQS review continued in 1985.

The CASAC met in May 1985 and reviewed the first draft of the lead staff paper and also conducted an initial review of the lead risk program. On the basis of their comments, the staff paper was revised and will be reviewed by CASAC in early 1986. During 1985, work proceeded on the lead risk assessment program and related exposure analyses. Also, the CASAC met in March 1985 and reviewed the first draft of the ozone criteria document. Since then, the criteria document has been revised on the basis of CASAC and public comments and was released in December 1985 for additional public and CASAC review.

E. REGULATORY ASSESSMENT OF TOXIC AIR POLLUTANTS

The EPA completed its commitment to Congress to consider 20-25 chemicals for regulation under section 112 of the Act. Three decisions were published in 1984 and 19 in 1985, for a total of 22. Nine of these have been notices of Intent to List (as a hazardous air pollutant) under section 112 of the Act, one (coke oven emissions) was listed under section 112, and one (methylene chloride) will be considered for regulation under section 112 or other Federal legislation. The pollutants covered by Intent to List notices are carbon tetrachloride, cadmium, chromium, chloroform, ethylene oxide, ethylene dichloride, butadiene, trichloroethylene, and perchloroethylene. Decisions announced in 1985 not to regulate under the Act were issued for chlorofluorocarbon 113, chlorinated benzenes, chloroprene, epichlorohydrin, hexachlorocyclopentadiene, manganese, methyl chloroform, and vinylidene chloride. For acrylonitrile, EPA instituted a program to cooperate with State initiatives to control sources of local or Regional concern.

In June 1985, EPA announced the development of a comprehensive strategy for reducing risks to public health from air toxics that deals with both routine and accidental releases. The strategy for routine releases involves three major thrusts: 1) a more aggressive direct Federal regulatory program that involves utilization of all EPA authorities, not just the Clean Air Act; 2) enhancement of State and local air toxics programs; and 3) a program to assess and regulate, where necessary, the elevated multipollutant, multimedia risks that occur in many large urban areas. The program for accidental releases involves the issuance by EPA of an acutely toxic chemicals list and associated guidance to assist States in determining who produces, stores, and transports these chemicals and in developing emergency preparedness and response plans for these facilities within their jurisdiction.

Also in 1985, the National Air Toxics Information Clearinghouse (NATICH) was significantly expanded through the implementation of the computerized NATICH data base.

F. STATUS OF AIR QUALITY MANAGEMENT PROGRAMS

As mentioned previously, EPA proposed revised NAAQS for particulate matter in March 1984. The proposed standards consist of primary standards that would apply to a size range of particles nominally 10 micrometers and smaller in diameter (PM_{10}), and an annual TSP secondary standard. The focus of the proposed primary standards on a new particle size range necessitated preparation of regulations, policies, and technical guidance so that SIP's for PM_{10} can be developed by the States. In April 1985, EPA published a Federal Register notice which solicited public comments on a number of considerations relative to implementing the proposed PM_{10} standards. A considerable number of comments were received on the PM_{10} implementation material. At the end of 1985, EPA was in the process of resolving the issues raised.

In 1982, a number of plaintiffs filed suit seeking to compel EPA to promulgate State plans for visibility protection under section 110(c) of the Act for those States which had not submitted such plans as required by regulations promulgated by EPA in 1980. Partially as a result of a two-part settlement agreement between EPA and the Environmental Defense Fund, EPA promulgated monitoring strategies for 22 States and visibility new source review programs for 20 States in two actions--July 1985 and February 1986. These actions, along with actions on some State-submitted plans, complete the first part of the settlement agreement. In compliance with the second part of the agreement, EPA reviewed the SIP's for the States and determined that 31 States were deficient for implementation control strategies and long-term strategies for visibility protection and one State was deficient for protection of integral vistas.

In July 1985, EPA adopted revisions to regulations originally published in 1982 which prohibit reliance by stationary sources on stacks in excess of "good engineering practice" or on any other dispersion techniques in lieu of emission controls. Known as the "stack height" regulations, these revisions were adopted after an extended comment period and public hearing. States were given 9 months from the date of promulgation of the revisions to review their rules and source emission limitations, and to revise and resubmit them to EPA as necessary. In a related action, EPA proposed a policy in December 1985 which, if adopted, would allow sources for which emission reductions are required under the stack height regulations to contract with other sources for the reductions in lieu of reducing emissions at their own facilities. To ensure that the balancing would have positive environmental benefits as great as, or greater than, those that would occur with stack-by-stack compliance with the stack height regulation, EPA proposed that the emission reductions from the source which is providing the reductions be greater than the reductions at the affected source.

The EPA made significant progress in 1985 in carrying out its responsibilities under the Act regarding the preconstruction review of new and modified stationary sources. In the area of delegation of prevention of significant deterioration (PSD) programs, EPA continued its progress of previous years. In a related area, in 1985 EPA developed a draft national policy for reviewing proposed PSD permit modifications and extensions. Such a policy appears to be increasingly important as many of the source owners with valid PSD permits wish to change conditions within their permits on the eve of their construction or operation.

As previously reported, the EPA's PSD and nonattainment new source review regulations have been challenged by a variety of entities. These challenges were consolidated as Chemical Manufacturers Association (CMA) v. EPA. On February 22, 1982, EPA entered into a litigation settlement with the industry petitioners in which it agreed to propose certain regulatory changes. The EPA has prepared final actions on a significant portion of the settlement. These documents were undergoing internal EPA review at the end of 1985. In addition, an important related matter of controversy has been the definition of "source" for the purposes of nonattainment new source review since the Act is not clear in this area. During 1985, EPA worked on the development of a policy which will aid the Regions in processing proposed SIP's in which the definition of source is a critical issue. Resolution of the definition of source should significantly accelerate the processing of revisions to the nonattainment portions of SIP's.

Also in the area of new source review, in 1985 EPA continued rulemaking on the issue of including fugitive emissions from surface coal mining operations when calculating whether a source is "major," and therefore subject to new source review.

The National Air Audit System (NAAS) was developed in 1983 as a joint effort by EPA, the State and Territorial Air Pollution Program Administrators (STAPPA), and the Association of Local Air Pollution Control Officials (ALAPCO). The primary goals of the NAAS are to identify any obstacles that are preventing State and local air pollution control agencies from implementing effective air quality management programs and to provide EPA with quantitative information for use in defining more effective and meaningful national programs. A national report summarizing the results of that 1985 audit was in preparation at the end of the year.

In 1985, EPA continued to work on the development of a final emissions trading policy to allow affected sources more flexibility in meeting air quality requirements. In addition, EPA had approved or proposed to approve 50 bubbles with an estimated savings of $300 million by the end of 1985. The EPA also assisted States in developing programs whereby surplus emission reductions can be banked and used to meet certain air quality management objectives. At the end of 1985, formal banking rules had been approved for five States or local areas.

In 1985, EPA continued efforts to explore the potential issues that could arise in implementing possible acid deposition control programs. Starting in 1984, State and local air pollution control agencies submitted 59 proposals to conduct a variety of projects to analyze various implementation issues. The EPA eventually selected 37 projects for funding. Work on the projects began in 1985. Also in 1985, EPA began to identify other implementation issues and options not being examined under the projects described above.

In 1985, EPA continued to provide technical training in the abatement and control of air pollution. This training included short course presentations of 3 to 5 days in length, self-study courses, technical assistance to others who conduct training, and the support of the traineeships and fellowships for graduate air pollution training. Nearly 2300 students received training through these efforts.

G. CONTROL OF STATIONARY SOURCE EMISSIONS

In the area of stationary source controls, work progressed on the development of emissions standards for those major source categories not yet regulated under new source performance standards (NSPS) and on the revision of various NSPS as appropriate. The NSPS for six new categories were promulgated in 1985 and the existing NSPS for one category was revised.

Section 112 of the Act authorizes EPA to establish national emission standards for hazardous air pollutants (NESHAP). Regulatory activities under this section limiting emissions of arsenic, benzene, asbestos, mercury, vinyl chloride, chromium and coke oven emissions were under way in 1985. In addition, technical studies, including engineering and control analyses, were commenced for 10 other compounds in 1985. The compounds under study are carbon tetrachloride, trichloroetyhylene, perchloroethylene, cadmium, chromium, chloroform, ethylene oxide, 1,3 butadiene, methylene chloride, and ethylene dichloride. Standards were promulgated for radionuclide emissions from the Department of Energy facilities, Nuclear Regulatory Commission licensed facilities and non-DOE Federal facilities, elemental phosphorus plants, and underground uranium mines. Work continued on standards for radon-222 emissions from licensed uranium mill tailings.

Also in 1985, EPA continued to make progress in delegating responsibility for implementing NSPS and NESHAP programs to State and local air pollution control agencies. At the end of 1985, approximately 94 percent of applicable NSPS and 95 percent of applicable NESHAP had been delegated.

The EPA also continued to maintain the Best Available Control Technology/Lowest Achievable Emission Rate (BACT/LAER) Clearinghouse in 1985 in order to assist State and local agencies in their Bact and LAER determinations.

H. STATIONARY SOURCE COMPLIANCE

The EPA closely monitors the compliance status of about 31,000 stationary sources of air pollution. Approximately 27,000 of these sources are Class A State implementation plan (SIP) sources, about 3,000 are NSPS sources, and about 1,000 are NESHAP sources. At the end of 1985, as has been the case since the late 1970's, the compliance rates were high and generally stable. Class A SIP sources had a compliance rate of over 90 percent, NSPS sources were over 89 percent, and NESHAP sources were over 86 percent. In 1985, EPA conducted 1,734 overview inspections of Class A SIP, NSPS, and NESHAP sources while the States conducted over 30,000 such inspections.

The Act provides a variety of administrative enforcement mechanisms for dealing with both special situations and relatively easily corrected violations. During 1985, EPA issued immediate compliance orders under section 113(a) of the Act to 111 sources and issued or approved delayed compliance orders under section 113(d) to 21 sources. In addition, EPA filed 73 civil actions in 1985 against stationary sources for Act violations and a total of 163 such actions were pending at the end of the year.

A major focus of the stationary source compliance program is the effort to return to compliance those sources meeting the definition of a significant violator. The universe of sources covered by this program include sources that are in violation of NESHAP and NSPS regulations and Class A SIP sources in violation of a SIP requirement located in a nonattainment area for the pollutant for which the source is in violation. For fiscal year (FY) 1985, EPA identified 513 significant violators pending at the beginning of FY 1985 and by the end of the fiscal year, 391 were addressed.

In 1985, EPA and States received 23,022 asbestos demolition or renovation notifications, conducted 10,482 asbestos inspections, and found 1,227 violations. The EPA issued 331 notices of violation or deficiency, issued 46 administrative actions, and initiated 18 civil actions for violations of asbestos demolition and renovation regulations. Delegated States also conducted a high level of asbestos enforcement action during 1985. The States issued 298 notices of violation or deficiency, issued 98 administrative orders, and initiated 16 civil actions.

On July 11, 1984, EPA issued a vinyl chloride NESHAP enforcement strategy which facilitates the development of civil complaints against violators of vinyl chloride regulations. The EPA filed three civil actions during 1985 for violations of the vinyl chloride standards. At present, 13 enforcement actions for violation of these standards are in litigation.

The EPA has been conducting pilot studies to determine the most promising techniques to address the problem of assuring continuous compliance by stationary sources. In 1984, EPA completed the first phase of the Virginia pilot inspection system. In 1985, EPA expanded the Virginia pilot inspection system to cover the entire State to determine if benefits comparable to that achieved by the more limited pilot can be obtained. Also in 1985, EPA completed a continuous emission monitoring (CEM) pilot that was primarily conducted in Missouri. The pilot evaluated the effectiveness of a CEM program as a program component of a multifaceted compliance monitoring effort. Finally, in 1985, EPA began pilot programs in Michigan and Colorado to develop more sophisticated methods for targeting compliance monitoring inspections.

Two significant enforcement actions were concluded by EPA in 1985. These included an action against the Chevron Oil Company for violations of PSD requirements and SO_2 emission requirements in the Texas SIP. This was a "penalties-only" case, and resulted in the largest cash civil penalty in EPA history. Over $4.5 million was awarded to the United States and over $1.5 million to the intervenor State of Texas. In addition, the United States Court of Appeals for the Fifth Circuit overturned two lower court decisions which had dismissed enforcement actions filed for violations by Ethyl Corporation and other companies of the national emission standard for vinyl chloride. The Fifth Circuit's action resurrected seven other vinyl chloride enforcement cases which had been stayed pending the Ethyl decision, as well as the two directly affected cases.

Also in 1985, EPA issued its revised inspection frequency guidance for stationary sources for FY 1986. This guidance was a product of a joint EPA, State, and local agency effort that provides States greater flexibility to target inspection resources to address their most significant air quality problems. The guidance also included a more comprehensive definition of a minimally-acceptable compliance inspection.

I. CONTROL OF MOBILE SOURCE EMISSIONS

In 1985, EPA initiated a number of actions aimed at controlling potentially toxic motor vehicle emissions. One of the key actions was work on controlling excess evaporative emissions. The possible carcinogenicity of gasoline vapor, as well as its contribution to ozone formation, and the known adverse effects of benzene are the primary concerns. In November 1985, EPA published a detailed technical study on this issue. Two other initiatives on air toxics also related to vehicle fuels. The first is the development of testing protocols to determine the health effects of fuels and fuel additives. Issue papers on this subject were under preparation in 1985 with rulemaking activity projected for 1987. The second is a review of the quality of diesel fuel. Reduction of sulfur and the aromatic content of diesel fuel may lead to significant reductions in particulate emissions from diesel engines. Preliminary work on this issue was started in 1985 with rulemaking activity planned for 1986 or 1987. In addition, the EPA has also been active in developing emission standards for methanol-fueled vehicles. The use of methanol as a transportation fuel has the potential to reduce hydrocarbon emissions from gasoline-type engines and particulate emissions from diesel-cycle engines. A proposal was developed in 1985, which will be published in 1986. Two final actions that took place in 1985 with a large air toxics impact were rules that set standards for particulate emissions from heavy-duty diesel engines and rules further reducing the amount of lead allowed in leaded gasoline.

Several accomplishments were made by EPA in 1985 in the area of developing standards for heavy-duty trucks and other commercial vehicles. In one action, regulations for heavy-duty diesel engines were completed which established a standard of 6.0 grams per brake horsepower-hour (g/bhp-hr) for oxides of nitrogen, and 0.6 g/bhp-hr for particulate emissions starting in the 1988 model year. The regulations also establish that the standards be tightened even further in 1991, to 5.0 g/bhp-hr for oxides of nitrogen, and 0.25 g/bhp-hr (0.1 grams for urban buses) for particulates. Trucks will be required to meet the 0.1 g/bhp-hr particulate standard in 1994. In addition, EPA implemented new and more stringent heavy-duty exhaust hydrocarbons (HC) and CO and evaporative HC standards, which took effect in the 1985 model year.

In order to ease manufacturers' transition to stricter standards, EPA promulgated nonconformance penalties for those engine families unable to meet certain standards applicable to a given model year. This mechanism assures that no manufacturer benefits financially from noncompliance, and that the least effective technology does not determine the stringency of standards for the entire industry.

Finally, in March 1985, EPA promulgated a rule which reduced allowable lead in gasoline from 1.1 grams per leaded gallon (gplg) to 0.5 gplg, effective July 1, 1985. The rule further reduces allowable lead to 0.1 gplg, effective January 1, 1986. At the same time, a rule was proposed to eliminate lead from gasoline altogether by 1988. The effect of these actions on refiners was mitigated by allowing them to bank and trade credits for unused lead, so that those refiners which produced leaded gasoline with lower lead content than the 1.1 gplg or the 0.5 gplg standard could use or trade the amount of lead saved, allowing them to offset exceedances of the 0.1 gplg standard, but still lowering the overall allowable amount of lead at the same rate during the regulation's phase-in period (i.e., until January 1, 1988).

An effective strategy for dealing directly with in-use emissions problems is the establishment of motor vehicle inspection and maintenance (I/M) programs. In 1985, EPA continued to promote the implementation of I/M programs in each locality where it is required by the Act. By the end of the year, 55 areas had initiated I/M programs. In order to assure that operating I/M programs actually achieve the planned emissions reductions, EPA has initiated a systematic I/M auditing plan. In 1985, EPA audited 12 I/M programs.

Section 207(c) of the Act authorizes EPA to order the recall of vehicles if a substantial number of any class of vehicles do not conform to emissions standards. During 1985, 1,521,600 vehicles were recalled either by direct order of EPA or as a result of an EPA investigation. In the same period, manufacturers voluntarily recalled 722,920 vehicles to correct emissions problems. The EPA conducted a total of 35 recall investigations in 1985, and performed 661 tests of in-use vehicles at laboratory facilities. In addition, EPA continued efforts begun in 1984 toward implementing light-duty evaporative emissions and heavy-duty recall programs by initiating a light-duty evaporative emissions investigation and completing a pilot heavy-duty project.

In order to assure that production vehicles are built in accordance with emissions standards, EPA conducts Selective Enforcement Audit (SEA) test programs at manufacturers' facilities. In 1985, EPA conducted 17 SEA test programs, including 4 at foreign manufacturers' facilities.

The EPA has responsibility for enforcing section 211 of the Act, relating to the regulation of fuels and fuel additives, and has established a nationwide fuels enforcement program to ensure that affected retail outlets comply with regulations aimed at protecting the catalytic converters on 1975 and later model year cars. The EPA conducted 12,500 inspections under this program during 1985.

The EPA is also responsible for carrying out programs designed to deter tampering with vehicle emissions control systems or using leaded fuel in vehicles which require unleaded. Since Federal efforts alone cannot effectively address these problems, EPA has promoted the implementation of State and local antitampering enforcement programs. In 1985, four local antitampering programs were set up as a result of this initiative.

J. STRATOSPHERIC OZONE PROTECTION

In 1980 EPA issued an advance notice of proposed rulemaking discussing possible further limits on domestic production of chlorofluorocarbons (CFC's) under section 157 of the Act. This was done in order to lessen depletion of stratospheric ozone and thereby lessen the amount of potentially harmful ultraviolet radiation reaching the earth's surface. However, some of the scientific information summarized in that notice was soon outdated by more recent work in the field, and there have been substantial changes in the research community's understanding of several important aspects of the issue since then. In general, the more recent work has demonstrated that possible changes in the ozone layer are affected by a more complex array of physical and chemical forces than previously thought. In addition, EPA believes that any decision on further regulation of domestic CFC production or use should be evaluated in the context of possible international regulatory actions. Accordingly, EPA developed a program for further examination and resolution of this issue which it published in January 1986. This program integrates the diverse scientific and economic research being carried on by EPA and by other organizations into a coherent framework for future EPA decisionmaking on both the domestic and international aspects of this issue.

K. RADON ASSESSMENT AND MITIGATION

Elevated concentrations of radon, a naturally occurring radioactive gas, have been found in homes across the United States. Because of the magnitude of the potential risks involved, this environmental problem received growing public and Congressional attention in 1985. Consequently, EPA developed a strategy to assist State governments and the private sector in assessing and mitigating the health risks due to indoor radon. The strategy builds upon existing knowledge and focuses not only on reducing significant current risks, but also on reversing trends in structure design, siting, construction, and maintenance that could increase future risks.

L. LITIGATION

Of the 13 cases related to the Act that were decided in 1985, 7 involved SIP's and other matters related to Title I of the Act, 1 involved regulation of fuel additives under Title II, and the remainder concerned various issues involved in judicial review.

Two of the SIP-related decisions in 1985 upheld EPA approvals of SIP's against challenges to the modeling methods on which they were based. In another case, a district court held that EPA must notify the Governors of various midwestern States that sulfur emissions from sources within those States were endangering the public welfare in Canada, thus setting in motion the SIP process to address such situations. The EPA appealed the decision and it was reversed by the Court of Appeals in 1986. Four other cases addressed various provisions of the Act related to areas designated nonattainment of one or more pollutants in 1985. One of these cases upheld EPA's approval of a nonattainment designation for the San Francisco Bay Area although it included several counties that, if considered separately, would be attainment areas. In another case, the court upheld EPA's refusal to redesignate a county in Ohio from nonattainment to attainment for O_3, despite monitoring data showing attainment there, because emissions from sources in the county contributed to violations of the O_3 NAAQS elsewhere. In still another case, the Court upheld EPA's imposition of a construction ban for three counties in Kentucky where the State had failed to enact enabling legislation related to motor vehicle I/M programs. In another action, the Court affirmed a district court decision refusing to vacate an earlier consent decree requiring Pennsylvania to implement an I/M program.

No cases involving radionuclides were decided in 1985. However, EPA and the Sierra Club entered into an agreement that led to a court stipulation and order to promulgate radon-222 emission standards for licensed uranium mill tailings by May 1, 1986.

In the one case decided in 1985 involving fuel additives, the Court vacated a fuel additive waiver previously granted by EPA on the ground that some of the conclusions EPA reached in granting it were not supported by the administrative record.

II. AIR QUALITY TRENDS, MONITORING, AND MODELING

This chapter describes current trends in ambient air quality levels (the concentration of a given pollutant in the atmosphere), as well as trends in estimated emissions into the air of various pollutants. In addition, the chapter discusses the topics of air quality monitoring and air quality modeling. Data on ambient air quality levels and emissions are through 1984, the latest year for which EPA has complete statistics.

A. NATIONAL AIR QUALITY AND EMISSION TRENDS

In 1984, 79.2 million people were living in counties with measured air quality levels that violated the national ambient air quality standard (NAAQS) for ozone (O_3). This compares with 61.3 million people for carbon monoxide (CO), 32.6 million people for total suspended particulate (TSP), 7.5 million people for nitrogen dioxide (NO_2), 4.7 million people for lead (Pb), and 1.7 million people for sulfur dioxide (SO_2). While millions of people continue to breathe air that is in violation of the NAAQS, considerable progress is being made in reducing air pollution levels.

Nationally, long-term 10-year (1975 through 1984) improvements can be seen for TSP, SO_2, CO, NO_2, O_3, and Pb. The trend in O_3 is complicated by a major drop in measured concentration levels which occurred between 1978 and 1979, largely due to a change in the O_3 measurement calibration procedure. Therefore, special attention is given to the period after 1979, because the change in the calibration procedure is not an influence during this time.

Air pollution trends were also examined over the most recent 5-year period (1980 through 1984) to take advantage of a larger number of monitoring sites and the fact that the data from the post-1980 period should be of the highest quality, with sites meeting uniform siting criteria and high standards of quality assurance. Nationally, improvements can be seen for all the pollutants during the 5-year period. Between 1983 and 1984, however, TSP, SO_2 and NO_2 showed slight increases in concentration while CO showed a slight decline, Pb a more substantial decline, and O_3 declined from its 1983 level to the levels of 1981 and 1982.

All of the ambient air quality trend analyses which follow are based on monitoring sites which recorded data in at least 8 of the 10 years in the period 1975 through 1984. In each of these years, annual data completeness criteria also had to be met. As a result of these criteria, only a subset of the total number of existing sites are used for trend purposes.

Total Suspended Particulate (TSP) - Annual average TSP levels, measured at 1344 sites, decreased 20 percent between 1975 and 1984. There was a 33 percent decrease in estimated TSP emissions for the same period. TSP air quality levels generally do not improve in direct proportion to estimated emissions reductions, because air quality levels are influenced by factors such as natural dust, reentrained street dust, construction activity, etc., which are not included in the emissions estimates. EPA has found that the TSP data collected during the years 1979-1981 may be biased high due to the glass fiber filter used during these years, and that most of the large apparent 2-year decrease in pollutant concentrations between 1981 and 1982 can be attributed to a change in these filters. TSP decreased between 1982 and 1983, while rainfall increased. Then in 1984, the TSP levels increased 2 percent over the 1983 levels, following a return of rainfall to more normal levels and an increase in particulate emissions.

Sulfur Dioxide (SO_2) - Annual average SO_2 levels measured at 229 sites with continuous SO_2 monitors decreased 36 percent from 1975 to 1984. A comparable decrease of 41 percent was observed in the trend in the composite average of the second maximum 24-hour averages. An even greater improvement was observed in the estimated number of exceedances of the 24-hour standard, which decreased 93 percent. Correspondingly, there was a 16 percent drop in sulfur oxide emissions. The difference between emissions and air quality can be attributed to several factors. The SO_2 monitors are mostly urban population oriented and as such do not monitor many of the major emitters which tend to be located in more rural areas. The residential and commercial areas, where most monitors are located, have shown sulfur oxide emission decreases comparable to the SO_2 air quality improvement. Between 1983 and 1984, nationwide average SO_2 levels increased 2 percent. The increase in ambient levels coincided with a 4-percent increase in sulfur oxide emissions, which reflects increased fuel consumption.

Carbon Monoxide (CO) - Nationally, the second highest nonoverlapping 8-hour average CO levels at 157 sites decreased 34 percent between 1975 and 1984. Although the median rate of improvement has been approximately 5 percent per year, this rate is less pronounced in the last few years. The estimated number of exceedances of the 8-hour NAAQS decreased 88 percent between 1975 and 1984. CO emissions decreased 14 percent during the same period. Because CO monitors are typically located to identify potential problems, they are likely to be placed in traffic-saturated areas that may not experience significant increases in vehicle miles of travel. As a result, the air quality levels at these locations generally improve at a rate faster than the nationwide reduction in emissions. Between 1983 and 1984, CO levels decreased only 1 percent. This leveling off appears to be consistent with CO emissions for the highway vehicle portion of the transportation category which showed a 1 percent decrease between 1983 and 1984.

Nitrogen Dioxide (NO_2) - Annual average NO_2 levels, measured at 119 sites, increased from 1975 to 1979, decreased through 1983, and then recorded a slight increase in 1984. The 1984 composite NO_2 average, however, is 10 percent lower than the 1975 level, indicating a downward trend during the overall period. The trend in the estimated nationwide emissions of nitrogen oxides is similar to the NO_2 air quality trend. Between 1975 and 1984, total nitrogen oxide emissions increased by 3 percent, but highway vehicle emissions, the source category likely impacting the majority of NO_2 monitoring sites, decreased by 4 percent. Between 1983 and 1984, the NO_2 composite average increased by 2 percent, while the estimated emissions of nitrogen oxides increased by 3 percent.

Ozone (O_3) - Nationally, the composite average of the second highest daily maximum 1-hour O_3 values, recorded at 163 sites, decreased 17 percent between 1975 and 1984. Volatile organic compound (VOC) emissions decreased 6 percent during the same period. Although the 1984 composite average for the 163 trend sites is 17 percent lower than the 1975 average, the interpretation of this decrease is complicated by a calibration change for O_3 measurements that occurred in the 1978-79 time period. In the post calibration period (1979 to 1984), O_3 levels decreased 7 percent, while VOC emissions decreased 10 percent. The estimated number of exceedances of the O_3 standard decreased 36 percent. The O_3 trends in the 1980's show that the 1980 and 1983 values were higher than those in 1981, 1982, and 1984. The previously reported increase between 1982 and 1983 was followed by a decrease of approximately 10 percent between 1983 and 1984. The 1984 ambient O_3 levels are very similar to the 1981-82 levels. This occurred despite an estimated national growth of almost 200 billion vehicle miles of travel between 1980 and 1984 and an expansion of economic activity in 1984.

Lead (Pb) - The composite maximum quarterly average of ambient Pb levels, recorded at 36 urban sites, decreased 70 percent between 1975 and 1984. Lead emissions declined 72 percent during the same period. In order to increase the number of trend sites, the 1980 to 1984 time period was examined. A total of 147 trend sites (1980 to 1984) from 23 States measured a 45 percent decline in Pb levels, corresponding to a 43 percent decrease in estimated Pb emissions. Between 1983 and 1984 ambient Pb levels declined 7 percent, while Pb emissions are estimated to have declined 13 percent. The decrease in ambient Pb levels results from three EPA control programs. Regulations issued in the early 1970's resulted in the Pb content of all gasoline being gradually reduced over the period of years. Secondly, unleaded gasoline was introduced in 1975 for use in automobiles equipped with catalytic control devices. Third, Pb emissions from stationary sources have been reduced by both the TSP and Pb control programs.

B. AMBIENT AIR MONITORING

General

Section 110(a)(2)(C) of the Clean Air Act (Act) requires State implementation plans to include provisions for establishment and operation of systems for monitoring ambient air quality. In addition, section 319 of the Act requires the development of uniform air quality monitoring criteria and methods and the establishment of an air quality monitoring system throughout the United States which uses uniform monitoring criteria and methods. To satisfy these requirements, EPA promulgated regulations in 1979 which required States to establish and operate air monitoring stations and report the data to EPA[1]. The two principal types of stations in the State networks are State and Local Air Monitoring Stations (SLAMS) and National Air Monitoring Stations (NAMS). The monitoring stations of the SLAMS and NAMS must adhere to the uniform monitoring criteria described in the regulation. These criteria cover quality assurance, monitoring methods, network design, and probe siting. January 1, 1981, was the deadline by which all NAMS were to meet all of the requirements in the regulations. The SLAMS had until January 1, 1983, to meet all of the provisions in the regulations. Based on 5 years of operating experience with the NAMS and SLAMS networks, some relatively minor modifications of the 1979 regulations were proposed in the Federal Register in 1985.[2] These modifications are intended to simplify and improve the overall monitoring program required by the Act.

Overall, State and local progress in meeting the requirements of the regulations continues to be excellent. Table 1 shows the status of the SLAMS network at the end of 1985. Of the 4674 operating monitors in the system, 4642 or 99 percent of the total monitors are meeting all requirements of the regulations. The remaining operating monitors should meet the requirements with some small changes in monitor siting and improvements in their standard operating procedures. Table 2 shows that of the 1357 planned NAMS, 1344 or 99 percent were in operation and were meeting all requirements of the regulations through December 1985. Table 3 lists, by pollutant, the number of SLAMS and NAMS.

Table 1. SLAMS Status through December 1985

	Number of Monitors	Percent of Network
Total planned network for 1986*	4674	-
Monitors operational through 12/85	4674	-
Monitors in operation meeting all requirements of the regulations	4642	99

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* Includes NAMS monitors and reflects small reductions and additions planned by a number of control agencies.

Table 2. NAMS Status Through December 1985

	Number of Monitors	Percent of Network
Total planned network	1357	100
Monitors operational	1344	99
Monitors in operation meeting all requirements of the regulations	1344	99

Table 3. National Summary of Operating Air Monitoring Stations (as of 12/85)

Pollutant	SLAMS (including NAMS)	NAMS
TSP	2424	639
SO_2	544	216
NO_2	246	57
CO	440	112
O_3	617	215
Pb	403	105
TOTAL	4674	1344

Particulate Monitoring

To accompany the proposed revisions to the NAAQS for particulate matter (PM), EPA on March 20, 1984, also proposed amendments to 40 CFR 58 (Air Quality Surveillance and Reporting Regulations).[3] The proposed revisions to Part 58 would establish ambient air quality monitoring requirements for PM_{10} as measured by a new reference method proposed as Appendix J of 40 CFR Part 50 or an equivalent method. In addition, new network design and monitoring siting requirements were proposed for the secondary TSP standard. The proposed requirements are comparable to those already established for the other criteria pollutants for which NAAQS have been set. These include requirements for reporting and assuring the quality of ambient PM_{10} data, designing monitoring networks, and the siting of samplers. Since most areas of the country did not have PM_{10} ambient monitoring data, EPA, in late 1984, procured 662 PM_{10} samplers for distribution to State and local agencies. Specialized training was provided by EPA to State and local agency personnel on the operation and maintenance of the PM_{10} samplers. Of the 662 samplers distributed to the States as of December 31, 1985, 495 or 75 percent of them have been sited and are operational. The remaining samplers are scheduled to come on line in 1986. The data from these sites will be used by the States in developing PM_{10} State implementation plans which will be required upon promulgation of a PM_{10} NAAQS.

Nonmethane Organic Compounds (NMOC) Monitoring

During the summer of 1985, more ambient hydrocarbon data were gathered in 18 cities following the 22-city study of 1984. Data from the 1985 study confirm that the new analytical method yields much more reliable and accurate measures of hydrocarbon concentrations than does the older measurement method. The 1985 data also confirm the 1984 data in indicating that ambient hydrocarbon concentrations in major metropolitan areas are somewhat higher than previously thought. This conclusion means that hydrocarbon controls in these areas may need to be increased in order to achieve the NAAQS for ozone. Several agencies have again indicated that they want to make additional measurements in 1986. During 1986, the EPA will provide technical support to these efforts and continue to analyze the data collected in 1984 and 1985.

C. AIR QUALITY MODELING

An air quality model is a set of mathematical equations that describes the atmospheric transport, dispersion, and transformation of pollutant emissions. By means of these equations, a model can be used to calculate or predict the air quality impacts of emissions from proposed new sources, emissions from existing sources, or changes in emissions from either of these source categories. These models are of great utility because they provide a means whereby the effectiveness of air pollution controls can be estimated before action is taken.

During 1985, a major EPA program to evaluate several categories of models was continued. This program was developed in response to recommendations of the American Meteorological Society under its cooperative agreement with EPA.[4] The evaluation of four mobile source models was completed[5] in a manner consistent with earlier evaluations of rural point source models and urban models. The results clarified the similarities and differences among several of these models for the five data bases considered. None of the models, however, showed clear superiority for all data bases. A peer scientific review will be conducted in 1986.

The EPA has also automated a procedure for generating tabulations of model performance statistics and for producing graphic displays that contrast performance levels among models. The model evaluation support system which provides for storage and retrieval of ambient data bases and predicted concentrations and produces standardized tabular summaries of model performance has been completed, documented and implemented for several additional data sets.[6] The most effective graphic displays of performance statistics have been selected and used to demonstrate with statistical confidence the differences between models for a variety of conditions.[7] A formal procedure for utilizing this information will be considered in 1986.

A technique to explicitly consider the impact of model uncertainty on regulatory decision making was coded and documented.[8] In 1986 the method for Calculation of Uncertainty Estimates (CUE) will be tested for a variety of sources, and various alternatives for its implementation will be considered.

A major new focus in air quality dispersion modeling was initiated during 1985. The EPA's activities in the regulation of toxic chemical impacts required the review of available dispersion techniques to adequately address different types of air pollutant releases than previously assessed. The emphasis shifted from stack releases at a few points within the facility to an assessment of pollutant discharges from vents, valves, flanges, etc. While these effects were usually determined on a long-term basis for the assessment of human risk to long-term exposure effects such as cancer, the effect of high concentration, short-term releases were also considered. This required the development of screening mechanisms and review of short-term release models and application of these techniques to test for potential acute health effects. During 1986, further development and review of available techniques will proceed to ensure the adequacy and appropriateness of such analyses.

Cooperative agreements with the State of New York and Connecticut to perform photochemical modeling of the New York metropolitan area, including parts of New Jersey and Connecticut were continued. This effort, entitled "Oxidant Modeling for the New York Metropolitan Area Project" (OMNYMAP), will test existing and alternative control strategies for attaining the ozone NAAQS. As part of this analysis, the performance of the Airshed Model will be evaluated and its sensitivity to specific variations in model inputs will be tested. In this way, the most critical parameters affecting control strategies will be identified. This work will be completed in 1986.

Efforts to improve guidance on air quality models[9] and to ensure consistency in their use have also continued. Model clearinghouse activities were continued to ensure that use of nonguideline techniques does not lead to inconsistent regulatory decisions. A workshop was held with modeling contacts in EPA's ten Regional Offices and two representative State agencies to improve communications on the use of models and to resolve common problems. The revised "Guideline on Air Quality Models" was subjected to a public hearing and comment. The hearing was conducted in conjunction with the Conference on Air Quality Modeling (Third) which is required at 3-year intervals by section 320 of the Act. A wide variety of public comments on various technical modeling issues were received. These were summarized and formal EPA responses and actions were documented. The guideline will be incorporated by reference in EPA's prevention of significant deterioration (PSD) regulations. Final rules to incorporate the revised guideline will be promulgated in 1986.

Receptor Model Activities

During 1985, EPA continued its series of reports to describe the uses, capabilities, and limitations of specific receptor models. One such report, the Receptor Model Source Composition Guideline, was prepared and distributed.[10] In addition, the Chemical Mass Balance (CMB) was improved to include consideration of collinearity among chemical source profiles. During 1986, EPA plans to prepare two protocol documents. One document will address the procedures for validating the CMB model and the other will address procedures for reconciling varying results from different receptor models. The end objective is to foster appropriate and consistent application of receptor models by State and local agencies. EPA also will continue with its series of reports describing specific receptor models.

Ozone Modeling

During 1985, EPA continued to provide technical support and review of ozone model applications using the Empirical Kinetic Modeling Approach (EKMA). The EKMA is widely used by State and local agencies to estimate emission controls necessary to attain the ambient air quality standard for ozone. Continuing efforts are under way to improve certain inputs to the EKMA model and to assist State and local agencies in its applications.

D. INTEGRATION OF AIR DATA SYSTEMS

The Aerometric Information Reporting System (AIRS) is a new integrated data system being developed by EPA to replace entirely the existing data bases, files, and software now used by the EPA for storing and retrieving ambient air quality data, stationary source and emissions data, and source compliance data. The AIRS project was fully approved by senior EPA management in December 1980 after the earlier comprehensive feasibility study revealed the advantages of a truly integrated data system. Detailed performance specifications were completed in 1981-82 which defined the overall structure of AIRS. The AIRS will be composed of two relatively separate components (air quality and facility data) but will use common sets of geographical and other codes and draw upon a state-of-the-art data base management system.

In 1985, work continued on the air quality component of AIRS. This segment is expected to be fully available for use by EPA Headquarters and Regional Offices by mid-1987 with pilot installations in some States begun by the end of 1987.

E. EMISSION FACTOR DEVELOPMENT

In 1985, EPA published emission factors for use by States and others to estimate source emissions and to compile emission inventories. Emission factor information is published and distributed for criteria pollutants in a publication entitled "Compilation Of Air Pollutant Emission Factors."[11] A fourth edition of this document was prepared and distributed in 1985. Current attention is on developing size-specific emission factors with special emphasis on particles less than 10 microns.

The EPA also distributed guidance in 1985 on procedures for estimating emissions for selected, potentially toxic pollutants. Final reports were distributed for phosgene, epichlorohydrin, and vinylidene chloride. Reports are now in preparation for chlorobenzenes, PCB's and ethylene oxides. Issuance of these additional documents is scheduled for 1986, pending the completion of peer review for each document.

F. NATIONAL DIOXIN STUDY

In 1985, EPA continued to implement the National Dioxin Study to assess the potential extent of contamination of the environment with chlorinated dioxin compounds. The study was divided into seven tiers, each designed to investigate a group of sources with a potential to contaminate the environment. Tier 4 focused on combustion sources and dealt primarily with emissions to the atmosphere. Thirteen sources were stack tested, and ash samples were collected at approximately 75 other sources. A summary report is scheduled for completion in early 1986, and a more detailed, technical report is scheduled for late 1986.

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III. AIR POLLUTION RESEARCH PROGRAMS

A. INTRODUCTION

In support of the Clean Air Act, EPA's Office of Research and Development (ORD) provides three services: (1) short-term research to fill specific scientific gaps for regulatory development, (2) technical assistance to the Office of Air and Radiation (OAR) and other organizations inside and outside EPA, and (3) anticipation of future regulatory questions and initiation of research to answer them. Decisions on program emphasis and pollutants to be studied are made through the research committee process. Air pollution research is planned jointly by ORD research managers and senior managers from OAR, with input from EPA Regional Office representatives and officials from EPA's policy and comptroller's offices. Air research planning and management is coordinated through the Air and Radiation Research Committee. Acid deposition and energy research is planned within the Multi-media Energy Research Committee. To ensure the maintenance of a cohesive research program, the Assistant Administrators for ORD and OAR have identified several classifications of research which express the full range of research needs for pollutants with similar regulatory relationships. The discussion which follows is organized according to these issues.

B. GENERAL AIR POLLUTION RESEARCH ACTIVITIES

In 1985, research on pollutants for which national ambient air quality standards (NAAQS) have been set emphasized control technology, particularly to assist in meeting ozone (O_3) attainment goals. Research on health effects of criteria pollutants centered on the responses of susceptible populations to ambient levels of pollutants. Research in support of new source performance standards (NSPS) and State implementation plans (SIP's) focused on volatile organic compounds (VOC) control and on modeling O_3 transport over complex terrain, such as mountainous areas. Hazardous air pollutant (HAP) research was broadened and accelerated, in step with EPA's general move toward increased emphasis on toxic air pollutants. The emphasis in the HAP research program is on evaluating total human exposure to these pollutants. The primary aim in the mobile source research program is to characterize evaporative and exhaust emissions from vehicles with alternate fuels, such as methanol. Radon mitigation in buildings became a priority in 1985, as more was learned about the health hazards posed by long-term exposure to radon in homes and offices.

Development of Scientific Assessments and Data on the Health and Welfare Effects of Criteria Air Pollutants

In 1985, work was continued on Air Quality Criteria Documents for O_3 and lead (Pb). These documents provide the scientific bases for the review and possible revision of the NAAQS for these pollutants. A second external review draft of the Air Quality Criteria Document for O_3 was published in November 1985.[1] This document included comments resulting from a Clean Air Scientific Advisory Committee (CASAC) review of the first external review draft earlier in the year. A follow-up CASAC meeting will be held in the spring of 1986 to review the second external review draft. Based on comments on the second external review draft of the lead criteria document, reviewed by the CASAC in May 1985, an addendum is being prepared which considers blood-lead/blood pressure relations.[2] An international symposium on aerosols, sponsored and organized by ORD, was held on May 19, 1985. The proceedings from that symposium will be published during 1986.

Considerable progress was made in characterizing the effects of acute exposures to oxidants in humans, particularly those persons who may be especially sensitive. Several studies were done in which children and adults were exposed to O_3 during moderate and vigorous exercise.[3-6] These studies showed slight pulmonary decrements following exercise during exposure to ozone. Children were somewhat more susceptible than adults. Humans with chronic obstructive lung disease or naturally acquired respiratory infection were studied following ozone exposure.[7,8] In addition, various other studies of the effect of ozone on immunity were performed in animals and humans.[9-12] The negative findings suggest that the host defense mechanisms in these individuals are not greatly compromised by exposure to ozone at ambient levels.

Pulmonary function effects of sulfur dioxide (SO_2) and aerosol particles were investigated in 1985. As part of EPA's efforts to identify potentially susceptible populations, exercising asthmatics were exposed acutely to SO_2 and sulfuric acid.[13] In another study, children were exposed to SO_2 and ammonium sulfate while exercising and at rest.[14] The significance of these studies is still being determined.

A 5-year follow-up study of the neurobehavioral effects of lead in children was completed.[15] In addition, two clinical studies were done which corroborate earlier findings on the neurological consequences of lead.[16,17] These studies indicate that neurobehavioral effects can be seen in children at much lower levels of lead than previously suspected.

Two important projects were completed on respiratory tract deposition of particles in animals. The deposition patterns of aerosol particles in the upper and lower respiratory system were determined in five common laboratory animals.[18] These patterns can be related to available human data. Deposition of insoluble particles was found to be related to route of breathing and activity level.[19] Advances were also made in modeling the uptake of ozone in the upper and lower respiratory system. One study of particular interest relates the site of ozone uptake to level of exercise and lower respiratory tract secretions.[20]

Based upon analysis of O_3 field data taken by the National Crop Loss Assessment Network (NCLAN) and processed through agricultural economic models, substantial dollar losses were attributed to O_3 damage under the exposure scenarios studied.[21] Several problems became apparent, however, from some of the field data. The most prominent one was the role of soil moisture deficits on crop response to ozone. These responses had not been studied earlier but evidence indicated a reduced ozone response during dry weather.

To improve EPA's ability to assess the impact of pollutants on materials, an advanced atmospheric corrosion monitor has been developed and evaluated.[22] This monitor is now being used in field experiments where air pollution levels will be related to materials damage.

A number of reports were prepared which detailed progress in measuring ambient air pollutants. These included a report on reference and equivalent methods, audits of laboratories which measure ambient pollutants, and quality assurance.[23-26] A report was provided on trace metals analyses.[27] A multi-site visibility monitoring network in California was established and preliminary data were generated.[28] The results of a 5-year study on air quality were published.[29] This work, by Stanford University, resulted in over 100 technical papers.

Development of Ambient Air Quality Models, Monitoring Systems Emission Characterizations, and Control Technologies

A promising new method of measuring nonmethane organic compounds was studied and the commercially available instruments were evaluated.[30] Progress was made in measuring air pollutants emitted from stationary sources, and a manual test method for determining carbon monoxide (CO) emissions was validated.[31-34] A final report was published on the National Air Pollution Background Network.[35] This network measured ozone concentrations in remote national forests for several years. The results will be used in the air quality standards revision process.

To increase the accuracy of current urban and regional scale air quality models, a number of studies examined the role of VOC's in producing ozone.[36] The data obtained from these studies have increased understanding of the role of precursors in atmospheric ozone formation.[37,38] An experimental procedure for estimating atmospheric reactivity was developed which uses the hydroxyl radical--a major atmospheric oxidizing agent--as a single indicator of atmospheric reactivity.[39] In this procedure, the reaction of VOC under hydroxyl radical attack is assumed to represent the more complex processes of atmospheric oxidation. This procedure was developed to assess the effects of individual VOC's on the production of ozone.

Experiments were conducted in EPA's special fluid model facility to determine optimum relationships among stack heights, terrain, and meteorological conditions.[40] The results of these experiments were needed to develop stack height estimates needed for air quality modeling of emission sources located in complex terrains. Also, two reports have been completed on the development of air quality models for complex terrain application.[41,42]

A major report was completed on assessing the state of science on atmospheric diffusion for use in air quality modeling.[43] The report evaluates existing techniques and provides a critical examination of the research still required on atmospheric diffusion. This work will have wide application to a number of models used in assessing air quality impacts resulting from stationary source emissions.

Ozone nonattainment remains a major EPA concern. Consequently, VOC control technology was emphasized in 1985. One important project was an evaluation of the efficiency of industrial flares, where it was discovered that flare efficiency was quite variable under different operating regimes and for different gases.[44]

Research to control nitrogen oxides (NO_x) emissions shifted away from the demonstration of low NO_x burners toward gaining an understanding of the combustion processes, thereby enabling the development of advanced combustion modification techniques.[45] Toward that end, advanced air staging, reburning, and precombustion technologies are being investigated.[46]

Several studies were completed on flue gas desulfurization (FGD), including the conclusion of a long-term project on organic acid enhancement of limestone FGD processes.[47-49] Begun in 1977, the commercial success of technology developed through this program has made further development of limestone FGD technology unnecessary. A three-year study to evaluate the current coal ash and FGD waste-disposal practices at coal-fired electric generating plants was completed.[50] The study characterized waste, gathered environmental data, assessed environmental effects, and evaluated engineering costs of disposal practices at six power plants at various locations within the USA.

A fundamental breakthrough in fabric filtration was developed called Advanced ESFF (Electrostatically Augmented Fabric Filtration).[51] This technology uses strong electrostatic fields to deposit matter preferentially upon selected portions of the fabric. The use of ESFF allows a marked reduction in the size of a baghouse needed to meet specified particle emission rates.

Development of Scientific Assessments, Monitoring Systems, Control Technologies, and Data on the Health Effects and Atmospheric Processes of Noncriteria Pollutants

Fourteen comprehensive health assessment documents for potentially toxic air pollutants were delivered to OAR in 1985.[52-65] Among these were documents on cadmium, ethylene oxide, dioxin, vinylidene chloride, and chloroform. In addition, health effects summary documents were prepared for four compounds. They are chloroprene, dibenzofurans, propylene oxide, and phenol.[66-69]

Under the Integrated Air Cancer Program, research to determine the contribution of air pollution to the incidence of cancer in the United States continued. A report on the first year's activity was completed.[70] An interim report on the northern New Jersey portion of a study using the total exposure assessment methodology (TEAM) was completed.[71]

Dose-response information to support the hazardous air pollutant program is developed in the areas of mutagenicity and cancer, neurotoxicology, inhalation toxicology, and developmental biology. The chemicals are either selected by OAR as high priorities or by the researchers to develop, test, or calibrate their testing systems. Studies completed in 1985 include several on toluene, manganese, and cadmium.[72-79]

In order to determine the transport, transformation, and fate of hazardous air pollutants, a number of laboratory and field experiments have been completed. Smog chamber studies, which can simulate a variety of atmospheric conditions, were conducted on potentially hazardous air pollutants.[80] This research provides information on the lifetimes and daughter products of important hazardous compounds. Also, selected chemicals which are emitted to the atmosphere in large quantities were tested to determine if they produce mutagenic compounds as a result of atmospheric oxidation reactions.[81]

Progress on the implementation of the Toxic Air Monitoring System (TAMS) continued throughout 1985.[82] Methods development continued for HAP's, including the validation of an emission test for arsenic.[83]

Regarding control of hazardous air pollutants, progress was made in three areas. First, the performance of catalytic oxidizers for destruction of chlorinated organic air pollutants was evaluated, primarily in conjunction with an Air Force program to reduce emissions from contaminated groundwater stripping. Second, a laboratory was designed to evaluate solid sorbents for organic air pollutant control. This facility will enable ORD to develop expertise on solid sorbents for organic HAP control. Third, a manual on technologies for HAP control was distributed for review to Regional, State, and local air pollution officials. Publication of the final manual is scheduled for mid-1986.

Evaluations have been initiated on the effectiveness of various measures for reducing emissions from woodstoves. These include combustion chamber designs, catalytic, and noncatalytic secondary combustion units and modified operating procedures. Initial results indicate that secondary combustion, both catalytic and noncatalytic, can significantly reduce total woodstove emissions.

Development of Monitoring Systems, Control Technologies, and Data on the Health Effects and Atmospheric Processes of Mobile Source Pollutants

Data collection was completed in a health effects study to determine pre-anginal changes in individuals with certain types of heart disease exposed to CO at levels sufficient to cause a 4 percent carboxyl hemoglobin (COHb) level.[84] Because of the negative findings, a follow-up study was initiated, following the same protocol after achieving COHb levels of 6 percent. A study of the respiratory carcinogenicity of diesel particles was published.[85]

A number of studies have been completed on the characterization of the emissions from a variety of motor vehicles, including light and heavy duty engines. One major study was completed on the characterization of emissions from vehicles using methanol and methanol/gasoline blended fuels.[86] This information will be used by EPA in developing regulations for methanol as a fuel or fuel additive.

A report summarizing the fuels and fuel additives registered in 1985 was prepared.[87] Quality assurance activities on the State and Local Air Monitoring System (SLAMS) continued for mobile source air pollutants. Additional statistical analyses were undertaken of the extensive data base collected in the 1982-1983 carbon monoxide human exposure field studies conducted in Denver, Colorado and Washington, D.C., and a journal article was published which summarizes the research findings.[88] Efforts to validate the Simulation of Human Air Pollution Exposure (SHAPE) computer model were initiated, using data from the Denver CO field study.

Development of Scientific Data to Determine the Impact of the Quality of Global and Microenvironments on Public Health and the Environment

In-house laboratory studies were conducted to determine the composition and rates of emissions from household building materials, such as particle board and adhesives. Research was also conducted to determine the organic emissions from unvented space heaters. Work was initiated on the development of a computerized data base for sources of indoor air pollutants.

In May 1985, an "Indoor Air Source Characterization Workshop" was held in Chapel Hill, North Carolina. This EPA-sponsored meeting attracted 60 researchers representing U.S. and foreign research institutes, universities, and private companies. Twenty-five papers, including three by EPA researchers, were presented on combustion sources, indoor materials, and biological sources.

The first phase of scheduled field testing to develop and demonstrate low cost residential radon mitigation techniques was completed in 18 homes in the "Reading Prong" of eastern Pennsylvania. The short-term results are encouraging. In four homes with initial radon levels of up to 7.4 working levels (wl), radon was reduced to 0.03 wl or less by the application of refined versions of these mitigation measures, representing indoor radon reductions of 97 to 99 percent.

Research has continued to assess the health and environmental effects of increased levels of certain forms of ultraviolet radiation due to the decrease of stratospheric ozone. In 1985, research focused on the effects of such radiation on such crops as soybeans, maize, wheat, rice, and citrus fruit, as well as on biologically important systems such as phytoplankton and zooplankton. Research was also conducted on stratospheric ozone model development, the epidemiology of melanoma, and the effects of increased radiation on photochemical smog formation.

C. ACID DEPOSITION RESEARCH ACTIVITIES

The EPA's acid deposition research program represents EPA's part of the National Acid Precipitation Assessment Program (NAPAP), which is administered through the Interagency Task Force on Acid Precipitation. The purpose of this research is to increase understanding of the causes and effects of acid deposition so that reliable information can be made available to policy-makers. This work supports efforts to determine what measure should be taken to resolve the acid deposition problem.

The widely used term "acid rain" refers to the atmospheric deposition of acidic or acid-forming compounds in either their dry or wet form. These compounds exist in the atmosphere as gases or aerosol particles containing sulfur oxides, nitrogen oxides, hydrogen chloride, sulfuric acid, nitric acid, and certain sulfate and nitrate compounds. While scientists are in general agreement that these compounds are responsible for varying degrees of atmospheric acidity, there is considerable controversy associated with the questions of causes, effects, and methods for mitigating or controlling acid deposition.

As part of the effort to provide research information to policy makers and the general public, EPA published "The Acidic Deposition Phenomenon and Its Effects -- Critical Assessment Review Papers." After a public comment period, the document was evaluated and revised. A final summary document, a "Critical Assessment Document,"[89] was submitted to the National Technical Information Service (NTIS) in August 1985.

Development of Long-term Deposition Monitoring Data

The acid deposition program collects wet deposition data through the National Trends Network (NTN). This 150-station network operated at peak efficiency during 1985, providing important scientific information from sites throughout the nation.

A growing body of evidence suggests that dry deposition, in the form of gases and aerosols, provides a significant contribution to total acidic deposition. In 1985, EPA conducted field testing on a prototype dry deposition monitor, and established a pilot dry deposition network of six sets of monitoring equipment at five locations in the eastern United States. One location at West Point, New York, has been equipped with dual monitors to evaluate the variability of the equipment.

The EPA began installation of a mountain cloud chemistry/forest exposure network in 1985. High elevation forests are frequently exposed directly to clouds. This network will measure air and cloud water chemistry, the frequency of cloud contact, and the amount of acidic material deposited on vegetation.

Efforts Related to Better Understanding of Atmospheric Processes

Quantification of source-receptor relationships will help decision-makers to evaluate the effectiveness of control strategies. Analytical tools (mathematical models) need to be developed to simulate atmospheric processes. In 1985, EPA completed development of the initial version of the Regional Acid Deposition Model. This model contains modules that simulate atmospheric transport, dispersion, chemical and physical transformation, precipitation scavenging, and dry deposition. These modules will be updated and revised as new scientific information becomes available.

Efforts Related to Emission Inventory Development

A special effort to develop a 1985 inventory of major emission sources of sulfur dioxide, nitrogen oxides, and volatile organic compounds was initiated to support future analytical efforts of the National Acid Precipitation Assessment Program (NAPAP). State submissions are due to EPA during the last quarter of 1986 and the final data base should be completed by June 1987.

Efforts Related to Better Understanding of the Aquatic Effects of Acid Deposition

Acidic deposition is believed to be a major contributing factor to episodic depressions of pH in aquatic systems, which may result in biological effects. Two major research efforts have been mounted to improve our understanding of aquatic effects: the National Surface Water Survey (NSWS); and the "Direct/Delayed Response" project.

The NSWS was initiated in 1984 to determine the chemical and biological status of lakes and streams in regions potentially sensitive to acidic deposition. Phase I of this survey will result in the sampling of over 2,000 lakes throughout the nation. Sampling in the eastern United States was completed during 1985, and the western portion will be completed in 1986. Phase II of the survey will quantify the biological components, and the seasonal and spacial variability of a regionally-representative subset of lake and streams. Phase III involves the selection of sites for long-term monitoring, in conjunction with the "Direct/Delayed Response" project, which will develop predictive models of watershed and surface model response to acidic deposition.

Efforts Related to Better Understanding of the Terrestrial Effects of Acid Deposition

Terrestrial effects of acidic deposition fall into two major categories: effects on soils and watersheds, and effects on forests. Acidification of surface water is a watershed-level phenomenon, and a full understanding of all of the processes involved is not expected for several years. In the near term, EPA will test the predictions made by "Direct/Delayed Response" models by using experimental manipulations in a small number of watersheds.

Preliminary data on foliar damage and growth reductions in several species of trees in different forest ecotypes suggest that environmental pollution, including acid deposition, may be a major or contributing cause. In 1985, EPA and the U.S. Forest Service initiated a joint research project to examine the forest decline syndrome in Northeastern and Southeastern forests. This project is designed to examine the causes of observed changes in forest health, and their extent and magnitude.

Efforts Related to Better Understanding of the Effects of Acid Deposition on Materials

In 1985, the materials effects research program produced a comprehensive regional estimate of the damage of materials from acidic deposition and other air-borne pollutants. While significant controversy has emerged concerning its assumptions, methodologies, and calculations of the analysis, the 17-state study provides a useful starting point for the technical dialogue. The study examined several metals, masonry, and paint.

Information on the Reliability and Cost-Effectiveness of the Limestone Injection Multistage Burner (LIMB) Control Technology

The EPA continues to develop LIMB technology that is designed to reduce SO_x and NO_x simultaneously in coal-fired boilers. In 1985, the LIMB program continued the development of high surface area sorbents to increase SO_x removal efficiency. Work continued on a co-funded contract for a full-scale demonstration of the LIMB technology on a wall-fired utility boiler near Lorain, Ohio. Funding is being provided by EPA, the State of Ohio, the Electric Power Research Institute, Ohio Edison, and Babcock and Wilcox (the prime contractor).

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IV. DEVELOPMENT OF NATIONAL AMBIENT AIR QUALITY STANDARDS

A. DESCRIPTION OF ACTIVITIES

The 1977 Clean Air Act Amendments require EPA regularly to review and, if appropriate, to revise all of the national ambient air quality standards (NAAQS). Reviews of all existing NAAQS were in progress during 1985.

After extensive review over the past 5 years, the primary (health-related) NAAQS for carbon monoxide (CO) was reaffirmed and the secondary (welfare) NAAQS was revoked in September 1985.[1] Work is proceeding on research studies to assess the health effects of CO. Results of studies on angina patients are anticipated in 1987. The EPA plans to review the study results with the Clean Air Act Scientific Advisory Committee (CASAC) and to assess the need for any revisions to the primary standards. If revisions seem appropriate, EPA will act expeditiously to revise the standards.

The annual primary and secondary NAAQS for nitrogen dioxide were reaffirmed in June 1985.[2] The decision on the need, if any, for a separate short-term primary standard was deferred pending the results of additional research on short-term health effects.

On March 20, 1984, EPA proposed changes to the NAAQS for particulate matter (PM).[3] The EPA proposed to replace the current 24-hour and annual primary standards for total suspended particulate matter (TSP) with standards that include only those particles less than 10 micrometers in diameter (PM_{10}). The EPA proposed to establish an annual secondary TSP standard and to revoke the current 24-hour secondary standard. The EPA also solicited public comment on the option of making the secondary standards equivalent in all respects to the proposed primary standards. As a result of a number of requests from the public and delays in publishing guidance for development of implementation plans, the comment period on the proposed standards was held open until June 1985. The proposal was reviewed at a CASAC meeting in December and CASAC recommended that because of new data published since the combined criteria document was prepared in 1981, EPA should prepare an addendum to the criteria document for PM and sulfur oxides and the PM staff paper. Due to the time needed for preparation and CASAC review of the criteria document and staff paper addenda, final action on the PM standard will be delayed until 1987.

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(14)EPA/450/2-85/007
(21) <See also PB85-180693.>





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Concurrence by the CASAC on the scientific accuracy and completeness of the staff paper[4] for sulfur oxides was received in 1983. Work on the exposure analysis and the cost, economic and benefits analyses continued in 1985. Recent studies on the health effects of sulfur oxides will be evaluated in the addendum to the combined criteria document for PM and sulfur oxides and the implications of these studies for the sulfur oxides NAAQS will be assessed in an addendum to the sulfur oxides staff paper.

The CASAC met in May 1985 and reviewed the first draft of the lead staff paper and also conducted an initial review of the lead risk program. On the basis of CASAC comments, the staff paper was revised and will be reviewed by CASAC in early 1986. During 1985, work proceeded on the lead risk assessment program and related exposure analyses. The results of these analyses will also undergo review by CASAC in 1986.

The CASAC met in March 1985 and reviewed the first draft of the ozone criteria document. Since then, the criteria document has been revised on the basis of CASAC and public comments and a second draft was released in December 1985. The first draft of the staff paper and the revised criteria document will be reviewed by CASAC in early 1986. An extensive program to formally use risk analysis in setting the ozone NAAQS is under way.

B. REFERENCES

1. 50 FR 37484, Sept. 13, 1985.

2. 50 FR 25532, June 19, 1985.

3. 49 FR 10408, Mar. 20, 1984.

4. "Review of the NAAQS for Sulfur Oxides: Assessment of Scientific and Technical Information - OAQPS Staff Paper," (EPA-450/5-82-007), Nov. 1982.

V. REGULATORY ASSESSMENT OF TOXIC AIR POLLUTANTS

A. DESCRIPTION OF ACTIVITIES

The EPA has completed its commitment to Congress to consider 20-25 chemicals for regulation under section 112 of the Clean Air Act (CAA). Three decisions were published in 1984 and 19 in 1985, for a total of 22. Nine of these have been Notices of Intent to List (as a hazardous air pollutant) under section 112 of the CAA, one (coke oven emissions)[1] was listed under section 112, and one (methylene chloride)[2] will be considered for regulation under section 112 or other Federal legislation. The pollutants covered by Intent to List notices are carbon tetrachloride[3], cadmium[4], chromium[5], chloroform[6], ethylene oxide[7], ethylene dichloride[8], butadiene[9], trichloroethylene[10], and perchloroethylene[11]. Further work on these pollutants was under way at the end of 1985.

Decisions announced in 1985 not to regulate under the CAA were issued for chlorofluorocarbon 113,[12] chlorinated benzenes,[13] chloroprene,[14] epichlorohydrin,[15] hexachlorocyclopentadiene,[16] manganese,[17] methyl chloroform,[18] and vinylidene chloride,[19]. For acrylonitrile, EPA instituted a program to cooperate with State initiatives to control sources of local or Regional concern. In the case of acrylonitrile (a carcinogen used in making plastics), public health risks from cancer are limited to a few industrial facilities. At the end of 1985, EPA was in the process of completing agreements with State or local agencies where acrylonitrile (AN) sources are located whereby the State and local agencies would evaluate and, if necessary, regulate the sources with EPA providing technical and scientific support. This approach would provide control of AN sources more quickly and more cost effectively than section 112 standards. Evaluations by the State or local agencies are under way or completed for most of the sources at the end of 1985. Public hearings on about half the sources were completed by the end of the year, with regulatory decisions on these sources expected by late spring of 1986. The other decisions for the other compounds mentioned above were generally based on the lack of adverse health effects at concentrations known or estimated to occur in the ambient air. In the case of several of the pollutants considered to be carcinogens, the risk to the public was estimated to be extremely small.

The status of the toxic air pollutant evaluation and control program as of the end of 1985 is summarized in Table V-1.

In June 1985, EPA announced the development of a comprehensive strategy for reducing risks to public health from air toxics that deals with both routine and accidental releases.[20] The strategy for routine releases involves three major thrusts: 1) a more aggressive direct Federal regulatory program that involves utilization of all EPA authorities, not just the Clean Air Act, 2) enhancement of State and local air toxics programs, and 3) a program to assess and regulate, where necessary, the elevated multi-pollutant, multimedia risks that occur in many large urban areas. The program for accidental releases involves the issuance by EPA of an acutely toxic chemicals list and associated guidance[21] to assist States in determining who produces, stores, and transports these chemicals and in developing emergency preparedness and response plans for these facilities within their jurisdiction. In conjunction with the release of EPA's Air Toxics Strategy, a final report on the magnitude and nature of the air toxics problem in the U.S. was released.[22] This report played a significant role in the development of the strategy.

Also in 1985, the National Air Toxics Information Clearinghouse (NATICH) was significantly expanded through the implementation of the computerized NATICH data base. Established in 1983, the Clearinghouse provides a tangible method of improving communication among EPA and State and local agencies. The Clearinghouse is funded by EPA and is a cooperative effort among EPA, the State and Territorial Air Pollution Program Administrators (STAPPA), and the Association of Local Air Pollution Control Officials (ALAPCO). The goal of the Clearinghouse is to disseminate information about activities under way to solve toxic air pollutant problems and to reduce duplication of effort. Some of the kinds of information included in the Clearinghouse are: (1) regulatory program activities, including acceptable ambient limits and emergency response program development; (2) source permit information, such as types and quantities of pollutants permitted and required control technology; and (3) source test and ambient monitoring methods in use. With the implementation of the NATICH data base, the Clearinghouse users (e.g., State, local air quality management agencies, EPA, industry, environmental groups and the public) may now have direct access to the Clearinghouse information through a user-friendly interactive program. In addition to direct computer access to the data base, hardcopy reports of the data base information are printed and distributed annually. Other publications on air toxics distributed in 1985 included four issues of the Clearinghouse newsletter, a bibliography of EPA reports and Federal Register notices,[23] a listing of EPA's ongoing research and regulatory development projects,[24] a report on the rationale for air toxics control in seven State and local agencies,[25] a reprint of the EPA Air Toxics Strategy,[20] an interim report summarizing data submitted by State and local agencies,[26] and a users guide for the NATICH data base.[27] Plans for 1986 include continuation of the prior publications plus publication of special reports on the EPA's risk assessments and procedures and on other data base sources of information.

B. REFERENCES

1. 49 FR 36560, Sept. 15, 1984.

2. 50 FR 42037, Oct. 17, 1985.

3. 50 FR 32621, Aug. 13, 1985.

4. 50 FR 42000, Oct. 16, 1985.
5. 50 FR 24317, June 10, 1985.

6. 50 FR 39629, Sept. 27, 1985.

7. 50 FR 40286, Oct. 2, 1985.

8. 50 FR 41994, Oct. 16, 1985.

9. 50 FR 41466, Oct. 10, 1985.

10. 50 FR 52422, Dec. 23, 1985.

11. 50 FR 52880, Dec. 26, 1985.

12. 50 FR 24313, June 10, 1985.

13. 50 FR 32628, Aug. 13, 1985.

14. 50 FR 39632, Sept. 27, 1985.

15. 50 FR 24575, June 11, 1985.

16. 50 FR 40154, Oct. 1, 1985.

17. 50 FR 32627, Aug. 13, 1985.

18. 50 FR 24314, June 10, 1985.

19. 50 FR 32632, Aug 13, 1985.

20. U.S. Environmental Protection Agency. "A Strategy to Reduce Risks to Public Health from Air Toxics," June 1985.

21. U.S. Environmental Protection Agency. "Chemical Emergency Preparedness Program Interim Guidance," Dec. 1985.

22. E. Haenisegger et al., "The Air Toxics Problem in the United States: An Analysis of Cancer Risks for Selected Pollutants," EPA 450/1-85-001, May 1985.

23. Bibliography of Selected EPA Reports and Federal Register Notices. National Air Toxics Information Clearinghouse, Pollutant Assesment Branch, Office of Air Quality Planning and Standards. January 1985.

24. Ongoing Research and Regulatory Development Projects. National Air Toxics Information Clearinghouse, Pollutant Assessment Branch, Office of Air Quality Planning and Standards. March 1985.

25. Rationale for Air Toxics Control in Seven State and Local Agencies. National Air Toxics Information Clearinghouse, Pollutant Assessment Branch, Office of Air Quality Planning and Standards. August 1985.

26. National Air Toxics Information Clearinghouse Data Base Report on State and Local Agency Air Toxics Activities. National Air Toxics Information Clearinghouse, Pollutant Assessment Branch, Office of Air Quality Planning and Standards. September 1985.

27. National Air Toxics Information Clearinghouse Data Base Users Guide for Data Viewing, National Air Toxics Information Clearinghouse, Pollutant Assessment Branch, Office of Air Quality Planning and Standards. September 1985. EPA 450/5-85-008.

TABLE V-1
Toxic Air Pollutant Evaluation and Control Program[1]

Preliminary Health Screening	Detailed Assessment[2]	SAB Review[4]	Regulatory Options Analysis[5]	Regulatory Decisions[6]	NESHAPS Proposed	NESHAPS Promulgated
Copper	Dibenzofurans	Nickel	Gasoline vapors	Asbestos (L)	Benzene	Mercury
Propylene	Phosgene		Asbestos[3]	Beryllium (L)	Arsenic	Beryllium
Propylene oxide	Acetaldehyde		Dioxins	Vinyl chloride (L)		Asbestos
Chlorine & HCl	Acrolein		Phenol	Coke oven emissions (L)		Vinyl chloride
Ammonia	Cresols		Formaldehyde	Benzene (L)		Benzene
Zinc & Zinc oxide	Hydrogen sulfide		Beryllium[3]	Arsenic (L)		Radionuclides
Styrene				Radionuclides (L)		
Naphthalene				Mercury (L)		
Toluene diisocyanate				Toluene (N)		
Xylenes				POM (N)		
Ethyl chloride				CFC-113 (N)		
Methyl methacrylate				Methyl chloroform (N)		
Maleic anhydride				Epichlorohydrin (N)		
Phthalic anhydride				Manganese (N)		
Methyl isocyanate				Chlorobenzenes (N)		
Mineral fibers				Vinylidene chloride (N)		
				Hexachlorocyclopentadiene (N)		
				Chloroprene (N)		
				Acrylonitrile (S/L)		
				Chromium (IL)		
				Carbon tetrachloride (IL)		
				Ethylene oxide (IL)		
				Chloroform (IL)		
				Ethylene dichloride (IL)		
				Cadmium (IL)		
				1,3-Butadiene (IL)		
				Methylene chloride (CR)		
				Perchloroethylene (IL)		
				Trichloroethylene (IL)		

[1] As of 1/13/86.

[2] Health and exposure assessment. Not yet submitted to SAB.

[3] Reassessment of original health effects information.

[4] Submitted to SAB. Recommendations not yet received.

[5] Recommendations received from SAB or no SAB review planned. Analysis under way to determine need for regulation.

[6] L = listed under §112; N = decision not to regulate; S/L = referred for S/L action; IL = intent to list under §112; CR = consideration of regulation under CAA, TSCA, SDWA or FIFRA.

VI. STATUS OF AIR QUALITY MANAGEMENT PROGRAMS

A. DEVELOPMENT OF POLICY AND REGULATIONS

Implementation Policy and Guidance for Revised Particulate Matter Standards

As discussed in Chapter IV of this report, EPA proposed revised national ambient air quality standards (NAAQS) for particulate matter (an annual and a 24-hour standard) that would apply to a size range of particles nominally 10 micrometers and smaller in diameter (PM_{10}), and an annual total suspended particulate (TSP) secondary standard. The focus of the proposed primary standards on a new particle size range has necessitated preparation of regulations, policy, and technical guidance so that State implementation plans (SIP's) for PM_{10} can be developed.

On April 2, 1985, EPA published a Federal Register notice which solicited public comments on (1) regulatory amendments which would accommodate the focus of the primary standards on the PM_{10} size range and which would establish the requirements for new source review programs, (2) a policy for SIP development for primary and secondary standards and the EPA's interpretation of the Clean Air Act which results in that policy, and (3) technical guidance specific to dealing with the PM_{10} size range.[1] The proposed regulatory amendments would focus the health-protecting air pollution episode programs on PM_{10} rather than TSP and would describe the requirements for a dual new source system, e.g., new sources would be reviewed for both PM_{10} and TSP emissions. The SIP development policy would establish time frames for SIP development for the primary and secondary standards. The PM_{10} technical guidance addresses development of emission inventories, dispersion and receptor modeling, ambient monitoring and data reporting, using ambient TSP data where PM_{10} data are not available, and monitoring for prevention of significant deterioration purposes.

Seventy-two comment letters were received, mostly from industry. The issue most frequently commented upon was the legal interpretation of the Clean Air Act as it would apply to primary PM_{10} standards. Other items addressed frequently were the need for ambient PM_{10} data before SIP development, the fugitive dust policy, the construction ban, and various new source review issues.

Public comments have been summarized and issues identified for resolution. At the end of 1985, the EPA was in the process of resolving the issues raised.

Visibility Protection

Section 169A of the Clean Air Act establishes as a national goal "the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from manmade air pollution." On December 2, 1980, EPA promulgated regulations implementing this section.[2] All States which contained mandatory Class I Federal areas were to develop and submit SIP revisions to EPA which implemented these regulations.

On December 20, 1982, a number of plaintiffs filed suit in the United States District Court for the Northern District of California seeking to compel EPA to promulgate State plans for visibility protection under section 110(c) of the Clean Air Act for those States which had not submitted such plans. During 1983, EPA and the plaintiffs negotiated and signed a settlement agreement which was accepted by the court on April 20, 1984. The settlement agreement calls for a two-part implementation of the 1980 rules. New source review requirements and a visibility monitoring strategy were proposed for the 34 deficient States on October 23, 1984.[3] The EPA promulgated monitoring strategies for 22 States and visibility NSR programs for 20 States in two actions in July 1985 and February 1986.[4,5] The EPA is reviewing the State-submitted plans for the remaining States. These actions complete the first part of the settlement agreement.

In compliance with the second part of the agreement, EPA reviewed the SIP's for the States and determined that 31 States were deficient for implementation control strategies and long-term strategies for visibility protection and one State was deficient for protection of integral vistas.[6] Federal plans to implement the deficient portions are scheduled to be proposed in 1986 and promulgated in 1987.

Tall Stacks and Other Dispersion Techniques

In July 1985, EPA adopted revisions to regulations originally published in 1982 which prohibit reliance by stationary sources on stacks in excess of "good engineering practice" or on any other dispersion techniques in lieu of emission controls.[7] Known as the "stack height" regulations, these revisions were adopted after an extended comment period and public hearing following the November 9, 1984 proposal.

The changes were ordered by the U.S. Court of appeals for the D.C. Circuit in Sierra Club v. EPA, 719 F.2d 436 (D.C. Cir. 1983) and will require additional control of emissions at some sources. An assessment of potential impacts was prepared to accompany the final regulations and estimated that reductions of up to 1.7 million tons of SO_2 could be obtained at an annual cost of up to $750 million. Actual impacts cannot be calculated until plant-specific analyses are performed, however. States were given 9 months from the date of promulgation of the revisions to review their rules and source emission limitations and to revise and resubmit them to EPA as necessary.

Stack Height Emission Balancing Policy

As a result of promulgation of the stack height regulations in July 1985, some sources will be required to reduce their emissions. These reductions may not be the most cost-effective reductions available. Therefore, in December 1985, EPA proposed a policy which, if adopted, would allow sources for which emission reductions are required under the stack height regulations to contract with other sources for the reductions in lieu of reducing emissions at their own facilities.[8] To ensure that the balancing would have positive environmental benefits as great as, or greater than, those that would occur with stack-by-stack compliance with the stack height regulation, EPA proposed that the emission reductions from the source which is providing the reductions be greater than the reductions at the affected source. Due to a number of factors, EPA proposed to require between 20 and 100 percent additional emission reductions.

The proposal opened a 30-day period for the public to comment on the general policy and a number of proposed restrictions. The EPA will review the policy and the restrictions in light of the public comments.

Federal Enforcement of Visible Emissions

The EPA is considering a new, modified visible emission test method for evaluating compliance with certain types of SIP opacity standards where the State has not specified a test method in the SIP. The existing method for Federal enforcement of SIP opacity limits in such cases is Test Method Number 9 of 40 CFR 60. The EPA started to develop this proposal during 1984 and plans to complete rulemaking in 1986. If adopted, this revised procedure would provide EPA with an expanded array of specific visible emissions testing procedures for various types of SIP opacity emission limitations and would allow EPA to better enforce SIP provisions.

Guidance to Promote Consistency in the Application of National Policies

During 1985, EPA continued to provide additional information to assist State and local agencies in the development of SIP's and other air programs by filling requests for copies of the Air Programs Policy and Guidance Notebook and by distributing an update of the Air Programs Reports and Guidelines Index containing almost one hundred new entries. The Notebook includes a collection of current memorandums concerning national policy and guidance. The Index represents a compilation of bibliographic information on current technical and guideline documents prepared by EPA over the past several years. The update was distributed to about 350 State and local agencies in addition to Regional and Headquarters personnel, all of whom are holders of the Notebook and Index.

Building State and Local Air Toxics Control Programs

In 1985, EPA continued its efforts to control toxic air pollutants and initiated a program to enhance the capabilities of State and local agencies to control air toxics. Accordingly, EPA set a goal to have an operative air toxics control program in all States by the end of 1986. In order to attain this goal, EPA took various steps to upgrade the air toxics control capabilities of State and local agencies. These activities included providing guidance on priorities for States to consider when developing control programs, sharing information regarding exemplary State/local air toxics control activities, and developing opportunities for interaction among State/local air toxics control personnel, including training opportunities. These activities are intended to improve State and local air toxics control capabilities, promote a strong State/EPA partnership, and expand the Nation's capability to deal effectively with toxic air pollutants.

B. PREVENTION OF SIGNIFICANT DETERIORATION AND NONATTAINMENT NEW SOURCE REVIEW ACTIVITIES

The EPA made significant progress in 1985 in carrying out its responsibilities under the Clean Air Act regarding the preconstruction review of new and modified stationary sources. Major 1985 activities are described below.

PSD Program Transfer

The EPA continues to emphasize the importance of high quality transfers of the prevention of significant deterioration (PSD) and new source review (NSR) programs. In addition to the strong legal and resource reasons for implementation by State and local authorities rather than EPA, the EPA believes that the critical growth decisions associated with the preconstruction review process should be made at the State and local level. The permitting process, once transferred, forms the key for minimizing source-specific SIP revisions in the future. In 1985, EPA continued its progress in transferring implementation of the PSD program to State and local agencies. The majority of PSD permits are now issued by these agencies. Although several transfers are presently being held up by litigation and resulting policy clarification, progress was made nevertheless. As of the end of 1985, 42 State and local agencies had either full delegation of the PSD program or a PSD SIP, and 9 more had partial responsibility for the PSD program. Two transfers of particular significance were to districts in California; this is a major breakthrough in the process of transferring the program to the rest of the State.

Modifications to Permits

In response to several requests, EPA has developed a draft national policy for reviewing proposed PSD permit modifications and extensions. Such a policy appears to be increasingly important as many of the source owners with valid PSD permits wish to change conditions within their permits on the eve of their construction or operation. This permit modification policy provides a more consistent approach for applicants, owners, and operators who propose changes to obtain revisions of existing permits or applications rather than having to apply for totally new permits.

Chemical Manufacturers Association v. EPA

As previously reported, the EPA's PSD and nonattainment new source review regulations have been challenged by a variety of entities. These challenges were consolidated as *Chemical Manufacturers Association v. EPA (CMA)*, D.C. Cir. No. 79-1112. On February 22, 1982, EPA entered into a litigation settlement with the industry petitioners in which it agreed to propose certain regulatory changes. An important part of the settlement agreement was satisfied by EPA's *Federal Register* proposal of August 1983.[9] That proposal addressed the topics of fugitive emissions in new source review applicability determinations, Federal enforceability of various emissions reductions, "buffer zones" around Class I areas, review of secondary emissions, and offset credit for past source shutdowns. At the end of 1985, EPA had prepared final action on a significant portion of the settlement. These documents were undergoing internal EPA review at the end of the year.

An important related matter of controversy has been the definition of "source" for the purposes of nonattainment new source review. The Clean Air Act is not clear in this area. In 1980, EPA promulgated a dual source definition that minimized the opportunity for modifications to sources to avoid review in nonattainment areas. This was challenged by industry in the *CMA* suit, but was not of primary concern in the settlement because EPA had replaced it with a "plantwide" definition in its rulemaking of October 14, 1981. The Natural Resources Defense Council claimed that the plantwide definition is inconsistent with the Act and, on August 17, 1982, the D.C. Circuit Court of Appeals ruled in their favor. Both EPA and industry representatives appealed this ruling, and on June 25, 1984, the Supreme Court decided in favor of EPA and the industry litigants. The EPA is presently developing a policy which will aid the Regions in processing proposed SIP's converting to a plantwide definition. Resolution of the definition of source should significantly accelerate the processing of revisions to the nonattainment portions of SIP's.

In an August 7, 1980, promulgation, EPA listed 30 source categories for which fugitive emissions would be included in PSD applicability determinations. Surface mining operations were not among these. The Sierra Club sued EPA on this point and on August 26, 1983, the D.C. Circuit Court of Appeals remanded this matter to the EPA for explanation of its position. In October 1984, EPA published final action on this issue, reaffirming its current requirements for the inclusion of fugitive emissions in calculating whether a source is "major" for purposes of NSR.[10] EPA further proposed to extend the requirements for inclusion of fugitive emissions to surface coal mining operations. According to the rulemaking criteria established by EPA, the proposed listing of surface coal mines is only a presumption which can be overcome if the rulemaking record reveals that the costs associated with listing are unreasonable relative to the corresponding benefits. A regulatory impact analysis has been prepared on that proposal and was made available for public comment in early 1986.

The remaining issues in the August 25, 1983, proposal are addressed in a Federal Register notice which will be published in 1986.

C. IMPLEMENTATION OVERVIEW AND ASSISTANCE

National Air Audit System

The National Air Audit System (NAAS) was developed in 1983 and implemented initially in 1984 as a joint effort by EPA, the State and Territorial Air Pollution Program Administrators (STAPPA), and the Association of Local Air Pollution Control Officials (ALAPCO). The need for the NAAS resulted from the fact that State and local air pollution control agencies have assumed responsibility for an increasing number of programs under the Clean Air Act over the years. The primary goals of the NAAS are to identify any obstacles that are preventing State and local air pollution control agencies from implementing effective air quality management programs and to provide EPA with quantitative information for use in defining more effective and meaningful national programs.

In 1985, a fifth audit area--motor vehicle inspection maintenance--was added to the other audit areas of air quality planning and State implementation plan activities, new source review, compliance assurance, and air monitoring. A national report covering the results of the audits of these areas for 1985 was in preparation at the end of the year as was a document providing guidance on conducting audits in subsequent years. In addition, a symposium was held in March 1985 with EPA, State, and local air pollution control agencies in order to develop recommendations based upon the results of the audit program which could be used in future resource planning efforts by EPA Headquarters and Regional Office personnel.

Status of Nonattainment Areas

The following table lists those areas of the country that were not in attainment with air quality standards as of the end of 1985. Note that totals are not shown since the same area may be nonattainment for more than one pollutant. A significant portion of the carbon monoxide and ozone nonattainment areas shown below are areas which received an attainment date extension under the Clean Air Act to December 31, 1987.

Pollutant	Number of Nonattainment Areas*
Particulate matter (primary standard)	134
Particulate matter (secondary standard)	191
Sulfur oxides (primary standard)	54
Sulfur oxides (secondary standard)	12
Nitrogen oxides	4
Carbon monoxide	141
Ozone	362

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*Areas listed are either counties or portions of counties.

Ozone Task Force

In 1985, EPA organized an Ozone Task Force to address the issue of widespread nonattainment of the ozone NAAQS. The Task Force initiated the process of developing control strategies for all ozone nonattainment areas, including those areas that received an extension of the ozone attainment deadline to December 1987 under Part D of the Clean Air Act but were not expected to attain by that time. Task Force activities in 1985 consisted of problem definition, development of needed data, and preparation of draft strategy alternatives. Public announcement of specific strategies is scheduled for 1986.

Emissions Trading

Emissions trading includes several alternatives to traditional regulation. These alternatives do not alter existing air quality requirements but simply give States and industry more flexibility to meet these requirements. Bubble trades and emissions reduction banking are two of the major emissions trading concepts being promoted by EPA.

Bubble trades allow existing plants (or groups of plants) to treat some or all of their emission points as though they were under a giant bubble and reduce or eliminate pollution controls where costs are high, in exchange for compensating increased control at emission sources where control costs are low. They give firms increased compliance flexibility, meet current or future pollution control requirements more quickly, make innovative control approaches profitable, and can result in significant savings over the costs of conventional controls. In 1982, EPA issued a proposed emissions trading policy to replace the original bubble policy and to streamline procedures, giving States and industry more opportunities to use bubbles in many more circumstances and geographic areas.[11] Since that time, EPA has reviewed numerous formal comments on the policy and developed alternatives to respond to specific issues raised by the commenters. In 1983, EPA proposed alternatives to shutdowns for public review and additional comment.[12] The EPA reviewed all of the comments that were submitted on the proposals and was proceeding toward the development of a final emissions trading policy at the end of 1985. As of December 31, 1985, EPA approved or proposed to approve 50 bubbles resulting in an estimated savings of more than $300 million over the cost of conventional pollution controls, with many producing energy savings and greater emission reductions than traditional regulation.

Bubbles can be approved by the States without case-by-case EPA review if evaluated under EPA-approved State procedures known as generic trading rules that assure no bubble will interfere with timely attainment and maintenance of the NAAQS. State generic rules are approved by EPA only if their procedures are replicable in operation to meet this test. As of December 31, 1985, EPA approved generic trading rules for nine States or local areas which allow these States to approve bubbles without prior Federal approval. The EPA also proposed to approve a generic rule for one State. At least 11 additional States or local areas were developing such rules. In addition to the 50 bubbles approved or proposed for approval by EPA 40 bubbles were approved by States under generic trading rules. At least 160 bubbles were under development or review either as SIP revisions or under generic rules. In total, over 250 bubbles were approved, proposed, under review, or under development in 29 States throughout the nation through the end of 1985. The total estimated savings from these bubbles exceeds $800 million.

Emissions reduction banking allows firms to get credit for surplus emission reductions and to store such emission reduction credits (ERC's) in a legally-protected manner. The ERC's can be "banked" (stored) and possibly used in bubble applications to meet control requirements for existing plants more flexibly and efficiently, as offsets to support economic growth in areas not meeting air quality standards, or in "netting" to exempt certain expansions or modernizations from new source review. Banking rules can speed trades between firms, expand opportunities for bubbles, and encourage the production of cheap ERC's at optimal times. Banking systems also provide the certainty needed for firms to invest in ERC's when meeting other control requirements, creating a pool of readily available credits that make trading easier, and speeds permit issuance while assuring progress toward clean air.

As of the end of 1985, formal banking rules had been approved for five States or local areas and approval of four Statewide or local banking programs had been proposed. Eight additional areas have adopted at the State or local level banking programs, some of which are under EPA review. Banking rules are known to be under development or consideration in seven more areas.

Acid Deposition Implementation Issues

In 1984, EPA initiated an effort to explore with the States the potential issues that could arise in implementing any possible acid deposition control program. Accomplishing this effort was planned in three phases: identifying key implementation issues and major options for dealing with them; evaluating various options using both "in-the-field" and "in-house" approaches; and preparing preliminary or prototype guidance on the issues. Major progress was made in 1984 on the first phase as EPA, in coordination with State and local air agencies, produced an initial listing and description of over 200 implementation issues.

In 1985, the focus shifted to analyzing the issues and evaluating the options for dealing with them, particularly through "in-the-field" studies. These studies, called State Acid Rain (STAR) projects, were to be conducted by individual States although the results could have broad applicability to other States that might be involved in a possible acid rain control program. The projects were eligible for funding through the $3 million in section 105 funds that Congress had appropriated for the development of "the technical and institutional foundations for future acid rain control strategies."

In application for this funding, State and local agencies submitted 53 proposals, and EPA, after consulting with STAPPA/ALAPCO, selected 31 projects for an initial round of funding. Later in the year, EPA reviewed the range of issues covered by the projects and identified six additional STAR projects for funding. In all, the section 105 special appropriation was able to fund 37 of the 59 project proposals. Thirty-seven States are involved in the effort directly and special procedures allow other States to participate in the review and evaluation of the projects. A national STAR workshop was held in November 1985 for EPA and the States to discuss and review the progress of the STAR projects thus far.

The EPA has begun to identify other important issues and options that should be investigated with "in-the-field" or "in-house" studies but are not being examined in the STAR projects. The EPA also began to determine what types of projects would be appropriate for examining these other issues and options.

VOC RACT Clearinghouse

The EPA has specified that the SIP revisions for areas designated as not attaining photochemical oxidant standards should contain, as a minimum, regulations for controlling volatile organic compound (VOC) emissions from stationary sources. These regulations must provide for the implementation of reasonably available control technology (RACT). To assist the States in defining RACT, EPA prepared a series of documents, referred to as control techniques guidelines (CTG's), which address various control options for a variety of individual stationary sources. Since EPA cannot publish CTG's for all affected VOC source categories, States may have to develop regulations using information sources other than CTG's. The purpose of the VOC RACT clearinghouse is to provide a means by which State and local air pollution control agencies can exchange technical information, minimize duplication of effort and resources, and provide guidance regarding VOC controls for various sources. The VOC RACT clearinghouse is a cooperative effort with STAPPA, ALAPCO, and EPA.

The VOC RACT clearinghouse output takes several forms, including a VOC RACT Clearinghouse Newsletter, which is targeted for publication on a quarterly basis. During 1985, four newsletters were issued. Other outputs during 1985 were a directory of air pollution control agency VOC contact persons, and a subject index and a title index for the VOC RACT Clearinghouse Newsletter.

D. AIR POLLUTION TRAINING

In 1985, EPA continued to provide technical training in the abatement and control of air pollution. This training included short course presentations (3 to 5 days in length), self-study courses, technical assistance to others who conduct training, and the support of traineeships and fellowships for graduate air pollution training.

During 1985, EPA conducted 27 short courses in 18 different subject areas for a total of 711 students. These courses were presented in locations across the U.S. by seven universities designated as area training centers. Technical assistance was provided to States and EPA Regional Offices for the conducting of 14 additional courses reaching a total of 385 students.

In support of the delegation of more air quality management responsibilities to the States, EPA continued emphasis on self-study courses as a means of providing training to more air pollution personnel. During 1985, 1163 students applied for the 30 self-study courses presently available.

As an additional means of developing qualified personnel, EPA supported 12 graduate traineeships/fellowships to employees of State and local air pollution control agencies. These awards are for both part-time and full-time graduate study in the field of air pollution control.

E. REFERENCES

1. 50 FR 13130, April 2, 1985.
2. 45 FR 80084, December 2, 1980.
3. 49 FR 42670, October 23, 1984.
4. 50 FR 28544, July 12, 1985.
5. 51 FR 5504, February 13, 1986.
6. 51 FR 3046, January 23, 1986.
7. 50 FR 27892, July 8, 1985.
8. 50 FR 52418, December 23, 1985.
9. 48 FR 38742, August 25, 1983.
10. 49 FR 43201, October 26, 1984.
11. 47 FR 15076, April 7, 1982.
12. 48 FR 39580, August 31, 1983.

VII. CONTROL OF STATIONARY SOURCE EMISSIONS

A. NEW SOURCE PERFORMANCE STANDARDS (NSPS)

During 1985, NSPS were promulgated under section 111 of the Clean Air Act (Act) for six new categories: nonmetallic mineral processing plants,[1] light weight aggregate,[1] gypsum,[1] perlite,[1] onshore natural gas processing (2 NSPS),[2,3] and wool fiberglass insulation manufacturing.[4] The existing NSPS for surface coating metal furniture[5] was revised. Standards were proposed for three new categories: volatile organic liquid storage vessels,[6] synthetic organic chemical manufacturing equipment leaks,[7] and distillation unit operations.[8] Revisions were proposed for two source categories: petroleum refineries[8,9] and portland cement plants.[10] Innovative technology waivers were proposed for several sources subject to the standard for automobile coating plants.[11] The reviews of NSPS for ammonium sulfate,[12] sulfuric acid plants,[13] and portland cement plants[14] were completed. Standards development programs now under way are planned to result in the promulgation of nine standards, the proposal of 14 standards, and completion of reviews for four existing NSPS during 1986.

B. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP)

° Arsenic - Work on NESHAP for glass manufacturing, high arsenic feedstock primary copper smelters, and low arsenic feedstock primary copper smelters continued in 1985 with a promulgation planned in 1986.

° Benzene - Work continued in 1985 on a source assessment for benzene emissions from gasoline marketing and on promulgation of the NESHAP for coke by-product plants. The proposed regulations for control of benzene emissions in maleic anhydride plants, ethylbenzene/styrene plants, and benzene storage facilities were withdrawn in 1984.[15] The withdrawal was based on the position that public health risks for these sources were determined not to be significant. In 1985 NRDC filed a petition for reconsideration of the withdrawal which EPA denied in late 1985. The NRDC then filed a petition to review the reconsideration denial.

° Asbestos - Work continued on revising the asbestos NESHAP during 1985. The revision will consider all source categories covered by the existing NESHAP and is scheduled for proposal in early 1987.

° Mercury - Work continued in 1985 on the revision of the mercury NESHAP. Promulgation is planned for 1986.

° Vinyl chloride - Revisions[16] to the vinyl chloride NESHAP were proposed in 1985 and are scheduled for promulgation in 1986.

° Chromium - During 1985, technical analysis began for chromium emissions from electroplating and cooling towers. Other chromium sources including utility boilers, industrial boilers, chromium chemical manufacturing, steel production, refactory manufacturing, sewage sludge incinerators, municipal incinerators, cement manufacturing, chromite ore refining, and ferrochromium production were under review at the end of 1985.

° Coke oven emissions - Standards development work continued in 1985 for coke oven emissions sources in the iron and steel industry. A proposed NESHAP for coke oven emissions is planned for 1986.

° Radionuclides - Standards were promulgated for radionuclide emissions from the Department of Energy (DOE) facilities, Nuclear Regulatory Commission licensed facilities and non-DOE Federal facilities, elemental phosphorus plants, and underground uranium mines.[17,18] Work continued on standards for radon-222 emissions from licensed uranium mill tailings.

° Other Compounds - In late 1985, technical analysis commenced for 10 compounds for which notices of intent to list under section 112 or to consider regulations under other statutes were published in 1985. The first phase of work, which should be completed in 1986, is to determine source categories for which controls will be considered. The compounds under study are carbon tetrachloride, trichloroethylene, perchloroethylene, cadmium, chromium, chloroform, ethylene oxide, 1,3 butadiene, methylene chloride, and ethylene dichloride.

The EPA's Office of Air and Radiation is coordinating with other Agency offices in the development of hazardous organic NESHAP for various chemicals and chemical classes.

C. DELEGATION OF NSPS AND NESHAP

The EPA continued to make progress in 1985 in delegating responsibility for implementing the NSPS and NESHAP programs to the State and local air pollution control agencies. The number of applicable NSPS and NESHAP vary for each State or local agency depending on the types of source categories that either exist or are likely to be built in the future. At the end of 1985, 42 State and local agencies had accepted delegation of all applicable NSPS and 48 had accepted delegation of all applicable NESHAP. These numbers represent delegation of approximately 94 percent of applicable NSPS and 95 percent of applicable NESHAP nationwide.

D. BACT/LAER CLEARINGHOUSE

New or modified facilities that are to be constructed in areas of the country that are currently attaining the national ambient air quality standards are required by the Act to install best available control technology (BACT). In those areas of the country that have not yet achieved compliance with the air quality standards, new or modified facilities are required to meet the lowest achievable emission rate (LAER) for that particular type of source. Both BACT and LAER requirements are determined on a case-by-case basis. Often an air pollution control agency will need to establish BACT or LAER requirements for a source type that is completely new to them or for which they have had only minimal experience. In these cases, the permitting agency may not be knowledgeable of the more recent advances in control technology for such sources and it is extremely helpful if the agency can refer to BACT or LAER determinations made by other control agencies.

The EPA established the BACT/LAER Clearinghouse several years ago in order to assist State and local air pollution control agencies by promoting the sharing of air pollution control technology information. The primary output of the Clearinghouse is an annual report of information about BACT/LAER determinations made by the various control agencies. The report published in 1985 contains over 1025 BACT/LAER determinations.[19] The report is available in hard copy and through an automated system. The automated data base can be accessed by both the public and the private sectors.

E. REFERENCES

1. 50 FR 31328, August 1, 1985.

2. 50 FR 26122, June 24, 1985.

3. 50 FR 40158, October 1, 1985.

4. 50 FR 7694, February 25, 1985.

5. 50 FR 18247, April 30, 1985.

6. 50 FR 14941, April 16, 1985.

7. 50 FR 14941, April 16, 1985.

8. 50 FR 14941, April 16, 1985.

9. 50 FR 46464, November 8, 1985.

10. 50 FR 36956, September 10, 1985.

11. 50 FR 36830, September 9, 1985.

12. 50 FR 9055, March 6, 1985.

13. 50 FR 34461, August 26, 1985.

14. 50 FR 36956, September 10, 1985.

15. 49 FR 23478, June 6, 1984.

16. 50 FR 1182, January 9, 1985.

17. 50 FR 15386, April 17, 1985.

18. 50 FR 5190, February 6, 1985.

19. "BACT/LAER Clearinghouse - (June, 1985) A Compilation of Control Technology Determinations."

VIII. STATIONARY SOURCE COMPLIANCE

A. GENERAL

The goal of the Clean Air Act (Act) is to protect public health and welfare and enhance the quality of the nation's air. The stationary source compliance program is designed to assure compliance with air emission standards by stationary sources of air pollution, including such major facilities as power plants, steel mills, smelters, and refineries. In addition to ensuring compliance with emission limitations contained in State implementation plans (SIPs), EPA and delegated States are responsible for ensuring that sources comply with new source performance standards (NSPS) and national emission standards for hazardous air pollutants (NESHAP).

The EPA closely monitors the compliance status of about 31,000 stationary sources of air pollution. Approximately 27,000 of these sources are Class A SIP sources*, about 3,000 are NSPS sources, and about 1000 are NESHAP sources. At the end of 1985, as has been the case since the late 1970's, the compliance rates were high and generally stable. The compliance status for the federally-tracked stationary sources is the following:

	In Compliance	In Violation; Meeting Schedule	In Violation; No Schedule	Unknown
Class A SIP	90.7%	1.9%	4.7%	2.7%
NSPS	89.6%	2.0%	5.6%	2.8%
NESHAP	86.7%	2.9%	5.4%	5.0%

The compliance status of stationary sources is determined and tracked principally by the States. Also, the States report this compliance information to EPA. In order to obtain information for purposes of determining compliance status or preparing a possible enforcement action or for other reasons, the States (and EPA) have the authority to enter and to inspect stationary sources. In 1985, the States conducted 30,698 inspections of Class A SIP, NSPS, and NESHAP sources.

EPA overviews States' compliance monitoring activities and supplements the States' enforcement efforts to resolve violations of air quality regulations. In 1985, EPA conducted 1,734 inspections of Class A SIP, NSPS, and NESHAP sources.

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*A Class A SIP source is a stationary source with actual or potential uncontrolled emissions, while operating at design capacity, equal to or greater than 100 tons per year of any regulated air pollutant.

The Clean Air Act provides a variety of administrative enforcement mechanisms for dealing with both special situations and relatively easily corrected violations. During 1985, EPA issued immediate compliance orders under section 113(a) of the Act to 111 sources and issued or approved delayed compliance orders under section 113(d) to 21 sources.

Section 120 of the Act is an administrative remedy designed to recoup the economic benefit which may come from violating air pollution control regulations. Nine section 120 cases were initiated in 1985.

The EPA is also authorized to file civil and criminal actions in Federal district court to order a source to comply with applicable requirements, to pay penalties, or both. There were 73 civil actions filed in 1985 against stationary sources for violations of the Act. As of January 1986, there was a total of 163 such actions pending with the U.S. District Courts. Convictions were imposed in one criminal prosecution in 1985. In addition, four cases were referred to the Department of Justice for criminal prosecution. These judicial actions addressed a broad spectrum of violations, including violations of SIP's, violations of federally-promulgated standards, and contempt actions for violations of judicial decrees.

A major focus of the stationary source compliance program is the effort to return to compliance those sources meeting the definition of a significant violator. The universe of sources covered by this program includes sources that are in violation of NESHAP and NSPS regulations and Class A SIP sources in violation of a SIP requirement located in a nonattainment area for the pollutant for which the source is in violation. For fiscal year (FY) 1985, the period starting October 1, 1984 and ending September 30, 1985, EPA identified 513 significant violators pending at the beginning of the fiscal year and by the end of the fiscal year, 391 were addressed. Of these, 187 were returned to compliance, 95 were placed on an acceptable compliance schedule, and 109 had an enforcement action pending. In addition, 191 significant violators were newly-identified during FY 1985 and, of these, 89 were addressed by the end of the fiscal year.

In 1984, EPA issued guidance on what constitutes a "timely and appropriate" EPA/State enforcement response for significant air violators. The guidance provides timeliness for action, addresses EPA issuance of notices of violation, and discusses when penalties must be obtained. In 1985, EPA evaluated the implementation of the "timely and appropriate" guidance and found it was being applied in virtually all States with little or no change from the national guidance. Also, the evaluation found that the guidance, by defining expectations and time frames, has improved relations between EPA and the States.

An area of intensive efforts for the last 2 years by EPA, reflected in the large growth in the number of significant violators, is the regulation of sources of volatile organic compounds (VOC's). Such sources are major contributors to the ozone nonattainment problem and some emit compounds which are highly toxic in nature. In response to requirements contained in the 1977 Clean Air Act Amendments, many States adopted regulations requiring compliance of VOC sources on or before the end of 1982.

In 1985, EPA established an Ozone Task Force to develop a consistent strategy addressing ozone nonattainment areas. Ensuring that stationary sources achieve and maintain compliance with VOC regulations is an important part of this strategy. Besides the basic problems associated with a new program (e.g., inadequate source inventory), obtaining compliance by VOC sources presents some particular difficulties. Regulations are complex. Sources and regulatory agencies are still developing the technical expertise necessary to assure compliance. In addition, large numbers of smaller sources (e.g., dry cleaners and degreasers) play a more significant role than for sources of particulates and sulfur dioxide (SO_2) emissions. The EPA will be exploring ways to enhance the existing VOC compliance program.

In 1985, the stationary source compliance program continued its major initiative to ensure that demolition and renovation sites are in compliance with asbestos NESHAP regulations. The demolition and renovation of old buildings, often in highly populated urban areas, is a major source of asbestos exposure. Because of the large number of demolition sites, a strong State and EPA effort is necessary to the success of the program. The program addresses training, inspection techniques, enforcement mechanisms, and other aspects essential for ensuring compliance.

In 1985, EPA and States received 23,022 asbestos demolition or renovation notifications, conducted 10,482 asbestos inspections, and found 1,227 violations. The EPA issued 331 notices of violation or deficiency, issued 46 administrative actions, and initiated 18 civil actions for violations of asbestos demolition and renovation regulations. Delegated States also conducted a high level of asbestos enforcement action during 1985. The States issued 298 notices of violation or deficiency, issued 98 administrative orders, and initiated 16 civil actions.

On July 11, 1984, EPA issued a vinyl chloride NESHAP enforcement strategy which facilitates the development of civil complaints against violators of vinyl chloride regulations. The EPA filed three civil actions during 1985 for violations of the vinyl chloride standards. At present, thirteen enforcement actions for violation of these standards are in litigation.

In the past, the focus of the stationary source compliance program was to ensure that major sources of particulates and sulfur dioxide achieved initial compliance with Act regulations, generally by either installing required control equipment or by switching to cleaner fuels. The more recent focus of attention, which will continue in the future, is addressing the continuous compliance problems of particulate and SO_2 sources (while continuing to work to ensure the initial compliance of VOC sources).

In 1984, EPA developed a strategy to assure continuous compliance by stationary sources. The strategy builds upon current use of on-site inspections as a major compliance monitoring method. It outlines a number of areas, such as unannounced inspections, better targeting of sources, and improved inspection techniques, in which inspections can be made more responsive to determining the compliance status of sources and assuring compliance on a basis more representative of day-to-day source operation. The strategy also calls for an increased use of continuous emissions monitoring (CEM) data, supported by a major EPA initiative to enhance CEM usage.

To implement this strategy, EPA has been conducting pilot studies to determine the most promising techniques to address the problem of assuring continuous compliance. In 1984, EPA completed the first phase of the Virginia pilot inspection system. The study, conducted in the Valley of Virginia region of the State, looked at methods to improve the effectiveness and efficiency of the inspection process. In 1985, EPA expanded the Virginia pilot to cover the entire State to determine if benefits comparable to that achieved by the more limited pilot can be obtained. In 1986, EPA will evaluate the results of this pilot effort. In 1985, EPA completed a continuous emission monitoring pilot that was primarily conducted in Missouri. The pilot evaluated the effectiveness of a CEM program as a component of a multifaceted compliance monitoring effort. The findings of the pilot were positive. In particular, the pilot demonstrated that CEM data is a useful tool for targeting inspections. In 1986, EPA will be promoting the use of CEM techniques and methods by State and local agencies. Finally, in 1985, EPA began pilot programs in Michigan and Colorado to develop more sophisticated methods for targeting compliance monitoring inspections.

In October 1985, EPA issued the "Technical Guidance on the Review and Use of Coal Sampling and Analysis (CSA) Data"[1] which supplements the "Technical Guidance on the Review and Use of Excess Emission Reports"[2] issued in 1984. These two technical guidance documents provide EPA Regions and State and local air pollution control agencies with ways CEM data can be useful to assess compliance, to target inspections, and to support enforcement.

B. LITIGATION

The following cases are examples of significant enforcement actions which were concluded in 1985.

1. Significant Judicial Decisions

United States et al. v. Chevron U.S.A., Inc., 23 Env't Rep. Cas. (BNA) 1265 (W.D. Tex. 1985)

On September 30, 1985, the U.S. District Court for the Western District of Texas imposed a civil penalty of $6,054,000 (plus 7.87 percent interest from the day of judgment and court costs) against Chevron for violations of prevention of significant deterioration (PSD) requirements and SO_2 emission requirements in the Texas State implementation plan. This was a "penalties-only" case, and resulted in the largest cash civil penalty in EPA history. Over $4.5 million was awarded to the United States and over $1.5 million to the intervenor State of Texas.

United States v. Ethyl Corporation; United States v. Occidental Chemical Corp. and Firestone Tire and Rubber Co. 761 F.2d 1153 (5th Cir. 1985), petition for cert. filed, 54 U.S.L.W. 2257 (U.S. Aug. 30, 1985) (No. 85-376).

On June 3, 1985, the United States Court of Appeals for the Fifth Circuit overturned two lower court decisions which had dismissed enforcement actions filed for violations of the national emission standard for vinyl chloride. The Middle District of Louisiana had ruled that the relief valve discharge provision of the vinyl chloride regulations was a "work practice" standard and was invalid because EPA, at the time of promulgation, lacked authority to adopt work practice requirements. The Fifth Circuit reversed and remanded, holding that the district court lacked jurisdiction to rule on the validity of the regulations, pursuant to section 307(b) of the Act. The Fifth Circuit's action resurrected seven other vinyl chloride enforcement cases which had been stayed pending the Ethyl decision, as well as the two directly affected cases.

2. Significant Administrative Decisions

U.S. v. American Cyanamid

On July 19, 1985, the presiding Administrative Law Judge ruled in favor of EPA with regard to liability in its case, initiated under section 120 of the Act, against American Cyanamid. The EPA's Notice of Noncompliance ("NON") alleged that volatile organic compound emissions from certain tanks at Cyanamid's Fortier plant were not being controlled by any of the means set forth in the SIP. Cyanamid petitioned for reconsideration on grounds that it was in compliance with the SIP by virtue of a "bubble," which had been approved by Louisiana. (The bubble had been submitted to, but not approved by, EPA.) The judge held that since EPA had not approved the bubble as a SIP revision, the company was in violation of the SIP at the time the Notice of Noncompliance was issued. On September 27, 1985, the Chief EPA Judicial Officer upheld this ruling on appeal. This was the first adjudicated section 120 action which EPA won, and the first appeal of a section 120 Initial Decision.

U.S. v. Dietzgen

On October 18, 1985, the presiding Administrative Law Judge ruled in favor of EPA's motion which sought to prohibit the introduction of evidence pertaining to Dietzgen's claims that compliance with applicable provisions of the Illinois SIP was technologically infeasible or economically unreasonable.

The judge cited as supporting precedent the appellate opinion upholding EPA in the section 120 action against the American Cyanamid Co., which clarified that all that is relevant in section 120 liability proceedings are SIP provisions which have been formally approved by the Federal as well as State government.

3. Significant Settlements

U.S. v. LTV Steel Co. (Republic Steel Co.)

In July and August 1985, three consent decrees were entered resolving contempt actions initiated by EPA to correct violations by Republic Steel Co. The settlements affect the following plants:

Youngstown/Warren, Ohio, Civil Action No. C-78-1659 (N.D. Ohio)
The consent decree amendment settled litigation consisting of two contempt motions by the United States and a motion to modify the decree by the defendant. This litigation arose out of Republic's failure to meet the emission limitation requirements of a March 1, 1979 consent decree regarding coke oven gas at its new Warren coke battery, and quenching requirements at its Youngstown and Warren coke batteries. In the amendment, Republic agreed to a penalty of $2.75 million of which $500,000 was to be paid in cash, and $2.25 million was to be satisfied in credit projects. The amendment provides new schedules for Republic to meet the desulfurization and quenching requirements and contains new stipulated penalty provisions to ensure compliance with the decree in the future.

Chicago, Illinois, Civil Action No. 80-C-0587 (N.D. Ill.)
The consent decree amendment resolves cross-litigation brought by the United States and by Republic regarding requirements of a December 12, 1980, consent decree for Republic's Chicago Works blast furnace casthouse. The amendment provides for payment of a $250,000 cash penalty by LTV Steel and requires LTV Steel to install positive (capture) controls to supplement the suppression system it has put in place.

Cleveland, Ohio Civil Action No. C-72-1680 (N.D.Ohio)
The amended decree provides that Republic will bring the basic oxygen furnace and the blast furnace casthouses at its Cleveland plant into compliance with emission limits representing reasonably available control technology. The Decree also provides that Republic will pay a cash penalty of $250,000.

C. COMPLIANCE and ENFORCEMENT GUIDANCE

Om March 19, 1985, EPA issued its revised inspection frequency guidance for stationary sources for FY 1986. This guidance was a product of a joint EPA, State, and local agency effort that provides States greater flexibility to target inspection resources to address their most significant air quality problems. The guidance also included a more comprehensive definition of a minimally-acceptable compliance inspection.

Other examples of enforcement guidance issued in 1985 include guidance on parallel cases under section 120 and section 113 of the Act (issued March 19, 1985), guidance on settlement of section 120 actions (issued March 19, 1985), a revised asbestos penalty policy (issued February 8, 1985), guidance on injunctive relief to be sought in asbestos demolition and renovation cases (issued July 10, 1985), guidance on the issuance of Notices of Violation (issued June 28, 1985), and guidance on injunctive relief for facilities intending to comply by shutdown (issued November 27, 1985).

D. COMPLIANCE BY FEDERAL FACILITIES

During 1985, Federal facilities demonstrated a good record of compliance with applicable air pollution regulations. As of the end of 1985, 308 (90 percent) of the 347 major Federal facilities met applicable emissions limitations. Of the 34 remaining facilities, 9 are meeting compliance schedules that will bring them into compliance, 20 are in violation and not yet on an acceptable schedule, and 5 are of unknown compliance status.

E. LIST OF VIOLATING FACILITIES

The list of violating facilities under section 306 of the Act is designed to prevent the Federal government from subsidizing certain Act violators with contract, grant, or loan monies. On August 21, 1985 the Sierra Transit Mix Co. of Las Vegas, New Mexico, was placed on the section 306 list of violating facilities. The listing was based on violations of an administrative order enforcing compliance with the NSPS for asphalt plants.

F. REFERENCES

1. "Technical Guidance on the Review and Use of Coal Sampling and Analysis (CSA) Data," EPA-340/1-85-010, October 1985.

2. "Technical Guidance on the Review and Use of Excess Emission Reports," EPA-340/1-84-015, October 1984.

IX. CONTROL OF MOBILE SOURCE EMISSIONS

A. INTRODUCTION

Control of motor vehicle emissions has been a Federal responsibility since 1968. The requirements of the Clean Air Act (Act) relating to mobile sources have been subsequently refined several times, most recently in 1977. The Clean Air Act Amendments of 1977 established an ambitious regulatory program which addressed remaining problems in the motor vehicle emissions control program and bolstered efforts to attain and maintain the national ambient air quality standards for carbon monoxide (CO) and ozone (O_3). Below are listed some of the the mobile source provisions of the 1977 Act.

- A schedule was established for implementation of stringent emissions standards for automobiles--0.41 grams per mile (gpm) for hydrocarbons (HC), 3.4 gpm for CO, and 1.0 gpm for oxides of nitrogen (NO_x). The table below displays the level of control mandated by the standards.

	Without Control	1977 CAA Standard	Percent Reduction
Hydrocarbons	8.8 gpm	.41 gpm	95%
Carbon Monoxide	87.0 gpm	3.40 gpm	96%
Oxides of Nitrogen	3.6 gpm	1.00 gpm	72%

- Similarly, the amendments tightened standards for emissions of the above mentioned pollutants from heavy-duty engines.
- Standards for the control of particulate emissions from diesel engines were mandated.
- Areas not meeting CO and O_3 ambient air quality standards were required to implement motor vehicle inspection and maintenance (I/M) programs.

Since the enactment of the 1977 amendments, EPA has made steady progress toward achieving the Act's goals. The EPA has made a number of modifications to its motor vehicle emissions standards in order to assure that they attain the goal of cleaner air as effectively and efficiently as possible. In 1985, EPA made significant progress toward the implementation of this program.

B. AIR TOXICS

The EPA has committed to a number of initiatives in the area of air toxics. One of the key actions is work on controlling excess evaporative emissions. The possible carcinogenicity of gasoline vapor and the known adverse effects of benzene are the primary concerns. In November, EPA published a detailed technical study on this issue.[1] After review of public comments, a proposed rule is expected in 1986.

Two other initiatives on air toxics also relate to vehicle fuels. The first is testing protocols to determine the health effects of fuels and fuel additives. Issue papers on this subject were under preparation in 1985 with rulemaking activity projected for 1987. The second is a review of the quality of diesel fuel. Reduction of sulfur and the aromatic content of diesel fuel may lead to significant reductions in potentially toxic particulate emissions from diesel engines. Preliminary work on this issue was started in 1985 with rulemaking activity planned for 1986 or 1987.

The EPA has also been active in developing emission standards for methanol-fueled vehicles. The use of methanol as a transportation fuel has the potential to reduce hydrocarbon emissions from gasoline-type engines and particulate emissions from diesel-cycle engines. A proposal was developed in 1985, which will be published in 1986.

Two final actions that took place in 1985 with a large air toxics impact were rules that set standards for particulate emissions from heavy-duty diesel engines and rules further reducing the amount of lead allowed in leaded gasoline. These actions are described in more detail below.

C. STANDARD SETTING

With the achievement of effective reductions of passenger car emissions, EPA has increasingly turned its regulatory focus toward the development of parallel standards for heavy-duty trucks and other commercial vehicles. Projections indicate that these vehicles will contribute an ever-increasing percentage of the mobile source emissions generated for the rest of this century. It is therefore important to establish standards for these vehicles to help ensure better air quality.

Accomplishments in this area during 1985 include the following:

- EPA moved forward in its development of standards for particulate and NO_x emissions for heavy-duty diesel engines. Regulations were completed establishing a standard of 6.0 grams per brake horsepower-hour (g/bhp-hr) for oxides of nitrogen, and 0.6 g/bhp-hr for particulate emissions, starting in the 1988 model year.[2] The regulations also establish that the standards be tightened even further in

1991, to 5.0 g/bhp-hr for oxides of nitrogen, and 0.25 g/bhp-hr (0.1 grams for urban buses) for particulates. Trucks will be required to meet the 0.1 g/bhp-hr particulate standard in 1994.

- EPA implemented new and more stringent heavy-duty exhaust HC and CO and evaporative HC standards, which took effect in the 1985 model year. In order to assure that manufacturers were in a position to meet these standards, EPA provided them with extensive support on technological and test procedure issues.

- In order to ease manufacturers' transition to stricter standards, EPA promulgated nonconformance penalties for those engine families unable to meet certain standards applicable to a given model year.[3] This mechanism assures that no manufacturer benefits financially from nonconformance, and that the least effective technology does not determine the stringency of standards for the entire industry. (This rulemaking was the first EPA action to feature an innovative process known as regulatory negotiation, in which all interested parties meet in an effort to settle their differences prior to initiation of the formal rulemaking process. The regulatory negotiation process proved to be extremely successful in this case.)

The EPA also moved forward in its study of railroad emissions, due to be published in 1986.

In March 1985, EPA promulgated a rule which reduced allowable lead in gasoline from 1.1 grams per leaded gallon (gplg) to 0.5 gplg, effective July 1, 1985. The rule further reduces allowable lead to 0.1 gplg, effective January 1, 1986. At the same time, a rule was proposed to eliminate lead from gasoline altogether by 1988. The effect of these actions on refiners was mitigated by allowing them to bank and trade credits for unused lead, so that those refiners which produced leaded gasoline with lower lead content than the 0.1 gplg or the 0.5 gplg standard could use or trade the amount of lead saved, allowing them to offset exceedances of the 0.1 gplg standard, but still lowering the overall allowable amount of lead at the same rate during the regulation's phase-in period (i.e., until January 1, 1988).[4]

The promulgation of this regulation was prompted by accumulating evidence of the health effects and other factors associated with the presence of lead in the ambient air. The regulation will significantly reduce atmospheric lead contaminations, and consequently blood lead levels and related medical costs. In addition, it should significantly curtail consumer fuel switching activities, which undermine EPA's mobile source emission control efforts.

In a related area, EPA granted a fuel additive regulations waiver for a methanol blend in 1985. This is expected to become an increasingly important area in response to the ongoing lead phasedown program, as refiners experiment with various additives as substitutes for lead in vehicle fuel.

D. PREPRODUCTION COMPLIANCE

One of EPA's long-standing techniques for assuring compliance with motor vehicle emissions standards is the preproduction certification program. Initiated in 1968, the program entails engineering review and testing by EPA staff of engine families representing new vehicles to be sold in the United States. Steps in the process include submission by manufacturers of technical data about respective vehicles, emissions testing of prototypes by manufacturers, review of engineering data and test results by EPA, and, in certain cases, confirmatory testing of prototypes at EPA's laboratory facility in Ann Arbor, Michigan.

A series of regulatory reforms implemented over the last several years have made certification a much stronger and more efficient and flexible program. As a result of computerization, elimination of redundancy, and administrative streamlining, the program has retained its full effectiveness while easing the procedural burden to manufacturers by one-third.

E. INSPECTION/MAINTENANCE

An effective strategy for dealing directly with in-use emissions problems is the establishment of motor vehicle inspection and maintenance (I/M) programs. The EPA's basic approach in this area was determined by the 1977 amendments to the Act. Urban areas of the country which obtained an extension in the deadline for attaining the ambient air quality standards for automotive-related pollutants beyond 1982 are required by the Act to implement an I/M program. In 1985, EPA continued to promote the implementation of I/M programs in each locality where it is required by the Act. By the end of the year, 55 of 63 areas had initiated I/M programs.

In order to assure that operating I/M programs actually achieve the planned emissions reductions, EPA has initiated a systematic I/M auditing plan. In 1985, EPA audited 12 inspection and maintenance programs. Auditing and thorough followup by Federal, State, and local officials will pinpoint and lead to correction of any major deficiencies in individual I/M programs.

F. MOBILE SOURCE ENFORCEMENT

The EPA mobile source enforcement program is directed primarily toward achieving compliance with motor vehicle emissions standards and fuel regulations as required by the Act. The major goals and objectives are to: (1) assure that both new and in-use vehicles meet emissions standards; (2) assure that emissions control systems are not removed or rendered inoperative; (3) assure that harmful additives are not present in gasoline; (4) administer statutory and California emissions standards waivers; and (5) administer the statutory emissions warranties.

In order to accomplish these goals, EPA maintains a number of basic motor vehicle enforcement programs:

Section 207(c) of the Act authorizes EPA to order the recall of vehicles if a substantial number of any class of vehicles do not conform to emissions standards. During 1985, 1,521,600 vehicles were recalled either by direct order of EPA or as a result of an EPA investigation. In the same period, manufacturers voluntarily recalled 722,920 vehicles to correct emissions problems. The EPA conducted a total of 35 recall investigations in 1985, and performed 661 tests of in-use vehicles at laboratory facilities in Springfield, Virginia and Ann Arbor, Michigan.

The recall program has traditionally focused on light-duty vehicle exhaust emissions. However, as new categories of emissions come under stringent control, the recall strategy must be applied to them. Therefore, in 1985, EPA continued efforts begun in 1984 toward implementing light-duty evaporative emissions and heavy-duty recall programs by initiating a light-duty evaporative emissions investigation and completing a pilot heavy-duty recall project.

In order to assure that production vehicles are built in accordance with emissions standards, EPA conducts Selective Enforcement Audit (SEA) test programs at manufacturers' facilities. The EPA has found that the SEA program encounters few failures because automobile manufacturers routinely test on a voluntary basis many more vehicles than are strictly required through SEA orders. Therefore, beginning in 1981, EPA changed its SEA policy to place greater reliance on manufacturer testing programs and less on EPA-mandated audits. In 1985, EPA conducted 17 SEA test programs, including four at foreign manufacturers' facilities.

The EPA has responsibility for enforcing section 211 of the Act, relating to the regulation of fuels and fuel additives. One of the regulations under this section of the Act is aimed at protecting the catalytic converters on 1975 and later model year cars and protecting public health by minimizing the amount of lead used in leaded gasoline ("lead phasedown").

The EPA has established a nationwide fuels enforcement program to ensure that affected retail outlets comply with these regulations. This program includes sampling of the fuel at retail outlets by Regional EPA field inspectors and private or State inspectors under EPA contract in order to measure the fuel's lead content. The EPA conducted 12,500 inspections under this program during 1985.

As mentioned before, rules expediting the lead phasedown schedule took effect in 1985. These rules are creating a demand for other additives which may have a harmful impact on auto emissions. The EPA expects that the proliferation of additives will create a need to monitor the composition of vehicle fuels even more closely than in the past.

The EPA is also responsible for carrying out programs designed to deter tampering with vehicle emissions control systems or using leaded fuel in vehicles which require unleaded. Surveys undertaken by EPA have shown tampering and fuel switching to be continuing serious problems which undermine the emissions control performance of many in-use vehicles. The latest survey indicates that about 28 percent of the vehicle fleet is subject to gross tampering, and about 16 percent to fuel switching.

Federal efforts alone cannot effectively address these problems. Consequently, EPA has promoted the implementation of State and local antitampering enforcement programs. In 1985, four local antitampering programs were set up as a result of this initiative.

G. IMPORTS

The control of emissions from imported vehicles has become a major issue in recent years. Due to various changes in consumer taste and the strength of the dollar in foreign exchange rates, vehicle imports have vastly increased their share of the U.S. auto market. Correspondingly, there has been a significant increase in the number of independent auto importers bringing cars into this country for resale. This has created a huge administrative burden in regulating the emissions from these cars. In 1985, EPA received 72,774 applications and 62,000 inquiries concerning the importation of nonconforming autos into the U.S. In response, the EPA is modernizing its imports program to handle this increase in demand, and is revising its regulations to make the process work more smoothly and efficiently. A supplementary notice of proposed rulemaking addressing the problems created by this increased demand was issued in 1985.[5] The final rule will be published in 1986.

H. REFERENCES

1. 50 FR 48100, November 21, 1985.

2. 50 FR 10606, March 15, 1985.

3. 50 FR 53454, December 31, 1985.

4. 50 FR 9400, March 7, 1985.

5. 50 FR 36838, September 9, 1985.

X. STRATOSPHERIC OZONE PROTECTION

A. DESCRIPTION OF ACTIVITIES

By preventing most potentially harmful ultraviolet radiation (UV-B radiation) from penetrating to the earth's surface, the ozone layer acts as an important shield protecting human health, welfare, and the environment. The possibility that the production, use, and release of chlorofluorocarbons (CFC's) could cause the depletion of stratospheric ozone was first theorized in 1974. If a net depletion of stratospheric ozone occurred, more UV-B radiation would penetrate to the earth's surface. This could result in a number of possible health and environmental effects. Although less was known about the possible causes and effects of ozone depletion in the mid-1970's, EPA and other agencies responded to concerns about this issue by promulgating regulations in 1978 limiting the use of CFC's as a propellant in nonessential aerosol spray cans.[1] By significantly reducing CFC use and therefore the risks of ozone depletion, this action provided more time to address the complex scientific questions involved in assessing those risks.

In 1980 EPA issued an advance notice of proposed rulemaking discussing possible further limits on domestic production of CFC's under section 157 of the Clean Air Act.[2] However, some of the scientific information summarized in that notice was soon outdated by more recent work in the field, and there have been substantial changes in the research community's understanding of several important aspects of the issue since then. In general, the more recent work has demonstrated that possible changes in the ozone layer are affected by a more complex array of physical and chemical forces than previously thought. In addition, EPA believes that any decision on further regulation of domestic CFC production or use should be evaluated in the context of possible international regulatory actions. Accordingly, EPA developed a program for further examination and resolution of this issue which it published in January 1986.[3] This program integrates the diverse scientific and economic research being carried on by EPA and by other organizations into a coherent framework for future Agency decisionmaking on both the domestic and international aspects of this issue. The three primary elements of the Agency's program are: (1) conducting analyses and research across a range of economic and scientific subjects aimed at narrowing uncertainties; (2) participating in a series of workshops and conferences both in the United States and abroad aimed at improving understanding of all aspects of this issue; and (3) deciding by November 1987 whether additional domestic regulation of CFC's is warranted, based on the information gained during the period of study. Key areas for analysis include evaluating potential future rates of growth in emissions; modeling the changes to the ozone layer that may result from changes in the atmosphere's composition;

analyzing model parameters and predictions in light of atmospheric monitoring data; evaluating potential health, welfare, and environmental effects from exposure to increased UV-B radiation or changes in climate related to ozone modification; and analyzing potential economic impacts, including the potential benefits from limiting UV-B exposure and the potential costs of limiting future increases in CFC's and other atmospheric perturbants.

B. REFERENCES

1. 43 FR 11301, March 17, 1978
2. 45 FR 66726, October 7, 1980
3. 51 FR 1257, January 10, 1986

XI. RADON ASSESSMENT AND MITIGATION

Radon Assessment and Mitigation

Elevated concentrations of radon, a naturally occurring radioactive gas, have been found in homes across the United States. Houses located in the Reading Prong area of eastern Pennsylvania have been found to have indoor radon concentrations up to one hundred times greater than the current occupational standard for underground uranium miners exposed to this gas. Because of the magnitude of the potential risks involved, this environmental problem received growing public and Congressional attention in 1985. Consequently, EPA developed a strategy to assist State governments and the private sector in assessing and mitigating the health risks due to indoor radon. The strategy builds upon existing knowledge and focuses not only on reducing significant current risks, but also on reversing trends in structure design, siting, construction, and maintenance that could increase future risks.

1. Determine national exposure distributions and identify high risk areas.
2. Mitigate exposure in existing structures.
3. Prevent exposure in future construction.
4. Provide for limited, yet essential, overall Federal program direction and leadership.

Concurrent with designing a study to meet the first objective, in 1985 EPA conducted a major program to help the State of Pennsylvania deal with severe indoor radon problems in the Reading Prong area of that State. This program will be expanded to neighboring States having radon problems and will also be incorporated into the national program.

The major components of the Reading Prong program include:

1. Providing technical assistance in developing a comprehensive measurement program to ensure consistency and utility of collected data.
2. Reducing radon exposure in existing homes through demonstrations, contractor training, and house evaluation programs.
3. Preventing excessive exposure in new homes through better construction designs, developing criteria for high-risk land, and changing model building codes.

4. Providing funds for remedial actions.
5. Disseminating public information on the risks of indoor radon exposure and ways in which exposure can be reduced.

XII. LITIGATION

A. INTRODUCTION

Of the 13 cases directly related to the Clean Air Act (Act) that were decided in 1985, seven involved State implementation plans (SIP's) and other matters related to Title I of the Act, one involved regulation of fuel additives under Title II, and the remainder concerned various issues involved in judicial review.

B. TITLE I CASES

1. SIP's

Two Ninth Circuit decisions upheld EPA approvals of SIP's against challenges to the modeling methods on which they were based. In Kamp v. Hernandez, 752 F.2d 1444 (9th Cir. 1985), the Court upheld approval of an Arizona SIP for sulfur dioxide that was based on use of a "multi-point rollback technique" rather than the more conservative "single-point rollback technique" used to develop SIP's in the past. In California v. EPA, F.2d __ (9th Cir. 1985), the Court upheld EPA's approval of the Lake Tahoe Basin SIP for carbon monoxide (CO) against challenges by California and Nevada to the modeling method each had used to predict CO emission increases from two proposed parking garages.

2. International Air Pollution (Section 115)

In New York v. Ruckelshaus, No. 84-0853 (D.D.C. 1985), the District Court for the District of Columbia held that EPA must notify the Governors of various midwestern states that sulfur emissions from sources within those States were endangering the public welfare in Canada, thus setting in motion the SIP process to address such situations. The EPA appealed the decision and it was reversed in 1986 by the Court of Appeals.

3. Nonattainment Areas

Four cases addressed various nonattainment area provisions of the Act in 1985. In Western Oil and Gas Ass'n v. EPA, 767 F.2d 603 (9th Cir. 1985), the Ninth Circuit upheld EPA's approval of a nonattainment designation for the San Francisco Bay Area although it included several counties that, if considered separately, would be attainment areas. The Court concluded that EPA had discretion to consider the contribution of emissions from sources in those counties to violations of the national ambient air quality standards (NAAQS) in other parts of the Bay Area.

Similarly, in Ohio v. Ruckelshaus, 776 F.2d 1333 (6th Cir. 1985), the Sixth Circuit upheld EPA's refusal to redesignate a county in Ohio from nonattainment to attainment for ozone, despite monitoring data showing attainment there, because emissions from sources in the county contributed to violations of the ozone NAAQS elsewhere.

In another Sixth Circuit case, Dressman v. Costle, 759 F.2d 548 (6th Cir. 1985), the Court upheld EPA's imposition of a construction ban for three counties in Kentucky where the State had failed to enact enabling legislation related to motor vehicle inspection/maintenance (I/M) programs.

Finally, in Delaware Valley Citizens' Council for Clean Air v. Pennsylvania, 755 F.2d 38 (3d Cir. 1985), the Court affirmed a district court decision refusing to vacate an earlier consent decree requiring Pennsylvania to implement an I/M program.

4. Radiation Program

No cases involving radionuclides were decided in 1985. However, EPA and the Sierra Club entered into an agreement that led to a court stipulation and order to promulgate radon-222 emission standards for licensed uranium mill tailings by May 1, 1986.

C. TITLE II CASES

In a 1984 case involving a methanol/gasoline blend called "Petrocoal," the D.C. Circuit ruled that EPA lacked authority to revoke a fuel waiver granted under section 211(f) of the Act, indicating that if EPA felt it had granted that waiver mistakenly it could take corrective action under section 211(c). American Methyl Corp. v. EPA, 749 F.2d 826 (D.C. Cir. 1984). In a 1985 case involving the same fuel, Motor Vehicle Manufacturers Ass'n v. EPA, 768 F.2d 385 (D.C. Cir. 1985), cert. denied 106 S Ct.852 (1986), the Court vacated the waiver on the ground that some of the conclusions EPA reached in granting it were not supported by the administrative record.

D. JUDICIAL REVIEW CASES

Five cases in 1985 addressed various aspects of judicial review. Three cases rejected challenges to the validity of EPA standards on the ground that judicial review of such standards is available only as provided in section 307(b) of the Act. U.S. v. Ethyl Corp., 761 F.2d 1153 (5th Cir. 1985); Caterpillar Tractor Co. v. Adamkus, __ F. Supp. _(D.Ill. 1985); Luckie v. EPA, 752 F.2d 454 (9th Cir. 1985).

Two other cases approved awards of attorneys' fees and costs for litigation under section 304 or section 307 of the Act. Delaware Valley Citizens' Council for Clean Air v. Pennsylvania, 762 F.2d 272 (3d Cir. 1985); Sierra Club v. EPA, 769 F.2d 796 (D.C. Cir. 1985). In the Sierra Club case, however, the Court declined to grant attorneys' fees against intervenors and for issues as to which plaintiffs had been unsuccessful.